

North Carolina - Coastal Zone Management Program

town of

NAGS HEAD

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1985 LAND USE PLAN UPDATE

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NAGS HEAD 1985 LAND USE PLAN

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April 4, 1986.

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Chapter 1.

Introduction: Overview of Nags Head and Land Use Planning Process

The Town of Nags Head is a unique and attractive resort community on the Outer Banks of North Carolina. A number of characteristics make it an attractive place to live or vacation. Among them are its proximity to water and beaches, its abundance of open spaces, its generally low density of development, and the overall quality of its natural environment. Nags Head is primarily an ocean-oriented community. The Town is fortunate to have significant natural resources, including the ocean and its beaches, the Sound, the complex natural area called the Nags Head Woods (consisting of stable, productive marshland, fresh water ponds and steep migrating and stabilized dunes) and unique geological features like Jockey's Ridge. Nags Head is a recreational wonderland, closely tied to its natural environment.

Nags Head has been a quaint village consisting predominantly of single family cottages and a few motels. Family operated businesses and cottage courts made up the commercial sector of Nags Head. These factors contribute to a certain charm, and a slow and relaxing pace of life. The Town has been the annual vacation spot for a countless number of families who make repeat visits from the north.

Nags Head has been slow to develop when compared to resort and vacation areas along the eastern coast that offer similar amenities (e.g., Myrtle Beach, South Carolina; Ocean City, Maryland). This has partly been a result of the remoteness of the Town. However, like all of the Dare County beach communities, Nags Head is beginning to experience tremendous growth and development pressures. As an indication, the permanent population has been growing at an annual rate of well over 10 percent. The most significant growth pressures in the Town are, and will continue to be, generated by seasonal resort development, however. Over two-thirds of Nags Head property owners, for example, are not permanent residents of the Town.

A 1984 survey of the attitudes of residents and property owners found that most were in agreement that Nags Head should remain the family-oriented beach it has been. The survey results also highlighted the high importance placed by residents and non-resident property owners on the quality of the natural environment, including such things as access to beaches and the protection of open space in the Town. Yet, the extreme growth pressures which Nags Head is currently feeling indicate that the Town has been "discovered," and that this discovery puts in jeopardy many of the features and characteristics that make the Town such an attractive place in which to live and vacation.

Furthermore, this growth is creating new and unique problems for the Town, including such problems as effectively dealing with hurricane evacuation and protecting the quality of its water resources, among many others.

The local planning requirements of the North Carolina Coastal Area Management program (CAMA) provide the framework in which to analyze and project these future growth pressures, identify the problems and concerns they raise, and to identify appropriate policies and actions for dealing with them. CAMA mandates that coastal localities update their land use plans at least every five years, and what follows in this plan is the result of the updating process. Nags Head is truly at an important juncture and this plan update must provide essential direction and guidance for managing Nags Head's growth, both in the short and long terms. It is important to acknowledge that even if this planning effort was not required under CAMA provisions, the Town would still have undertaken it.

The Town considers the following CAMA guidelines regarding resource production and management issues not applicable and relevant to Nags Head at this time and will not be discussed in the plan:

1. Productive agricultural lands;
2. Existing and potential mineral productive areas;
3. Commercial and recreational fisheries;
4. Peat or phosphate mining and industrial impacts on any resource;
5. Energy facility siting and development; and
6. Marina development and floating home development.

The essential purpose of this plan is to permit Town officials to make the most deliberate and informed decisions as possible about future growth. The plan attempts to comprehensively analyze the likely impacts of growth, identify Town goals with respect to these impacts, and present policies and actions to manage this growth consistent with these goals. This plan will be used and referenced in future land use decision-making, and in particular by several key sets of local actors: the Board of Commissioners, Planning Board, Zoning Board of Adjustment, and the Town's Department of Planning and Development. As well, the Board of Commissioners has appointed a Citizens' Advisory Committee to collect public opinion on planning issues, and to act as liaison between the Board of Commissioners and citizens in the community.

The land use planning in Nags Head is a continuous and ongoing process. Numerous land use decisions are made each month. While the following plan represents the codification of Town policies at one point in time, the Town's land use plan is dynamic and evolutionary. Hopefully, this plan provides the basis for understanding the implications of future land use decisions (including failing to take action), and will serve as an overall framework for guiding future decisions by the Town.

Some significant ordinances adopted since the 1980 land use plan are: (1) Nags Head Village Ordinance, which establishes stringent estuarine setbacks; (2) street standards for environmental streets; (3) drainage ordinance; (4) motel, shopping center standards; (5) water tap allocation ordinance; and (6) an ordinance to eliminate multiple curb cuts.

Organization of the Plan

The plan begins with a review and analysis of population and development trends in the Town, and the implications of this growth (e.g., increasing service demands, impacts on environmental systems, etc.; Chapter 2). Chapter 3 examines the different dimensions of growth which can be modified to effect local goals, and the alternative approaches to growth management which might be used to accomplish this. This chapter also provides specific examples of how the impacts of growth can be altered through growth management intervention.

Chapters 4 through 16 provide specific discussions of particular substantive policy areas of relevance in Nags Head. These chapters discuss subjects such as water quality, shoreline management and protection, housing, traffic and transportation, hurricane and coastal storm hazard mitigation, sewer and water service, economic development and others. Each of these chapters is structured in the same way, beginning with a discussion of problems and issues, the delineation of a community goal, and finally the preparation of a fairly detailed set of land use policies to advance the goal.

Chapter 17 ("Policies and Implementation Methods") analyzes the policies identified in chapters 4 through 16 for their ability to advance a number of community goals simultaneously. From this analysis, a list of more specific implementation activities is prepared. Finally, Chapter 18 discusses the Town's land classification system.

Chapter 2.

Assessing the Growth and Development Pressures In Nags Head

Introduction

Nags Head is growing and changing, and the primary purpose of this plan is to manage and guide these forces so that important values are protected and goals advanced. This chapter establishes the baseline assumptions concerning future growth and provides an initial starting point for identifying local growth-related problem areas, the magnitude of these problems, and the urgency with which they need to be addressed. The theme of this chapter is that the forces of growth and change are being seen in Nags Head as they have never been seen before, and that these forces will have tremendous implications for everything from water quality to hurricane evacuation.

This chapter begins by looking at statistics concerning the growth of the permanent population of the Town. It goes on to analyze the availability of land for future development, current development and building trends, and projects peak levels of development and population growth under total permissible buildout. Finally, to illustrate the impacts of future growth in the Town, the increase in demand for such services as water consumption and solid waste disposal, and the degree of negative side effects such as impervious surfaces are projected.

Permanent Population

Because Nags Head was incorporated in 1961, census data is only available for 1970 and 1980. In 1970 there were only 414 permanent residents in the Town (See Table 2-1). By 1980 this population had more than doubled, and in the four years between 1980 and July 1, 1984, the permanent population is estimated to have grown an additional 36%. Estimates of permanent population for Nags Head beyond 1984 have not yet become available from the North Carolina Office of State Budget and Management.

Some general conclusions can be drawn from the age class differences between the 1970 and 1980 census data. In 1970, approximately 43% of the population was 45 years old, or older, however, in 1980, 53% of the population was 45 years old, or older.

Future projections of Nags Head's permanent population can be made under different assumptions, using projections for Dare County made by the State. Table 2-2 presents these projections under alternative assumptions. Column I provides population projections for Dare County to the year 2010. Column II presents projections of the Nags Head population based upon the proportion of the County population that it constituted in 1980. It represents the most conservative projection. Column III calculates these projections

assuming that Nags Head's share of the County population increases to 10%. Column IV computes the projection based upon the percentage increase between 1970 and 1980, or 146%. Because of the recent levels at which Dare County and the Dare beach communities have grown in recent years, the 146% projection assumption appears most reasonable. Under this methodology, the Town will contain over 6,000 permanent residents by the year 2000 and 15,000 by the year 2010.

Permanent population does not, however, capture the real growth pressures to be placed on the Town of Nags Head. Rather, Nags Head is a resort community, which experiences dramatic increases in seasonal population during the summer months. The problems of growth with which the Town must wrestle in the future are generated by this component of the population, and the residential and commercial development produced to accommodate it. These premises are better elucidated with other data discussed below.

Table 2-1.

Permanent Population, Dare County and Nags Head

| <u>Year</u> | <u>Dare County</u> | <u>Nags Head</u> |
|-------------|--------------------|------------------|
| 1960 | 5,935 | |
| 1970 | 6,995 (17.9%) | 414 |
| 1980 | 13,377 (91.2%) | 1,020 (146%) |
| 1982 | 1,166 (14.3%) | |
| 1983 | 15,327 (14.6%) | 1,330 (14.1%) |
| 1984 | 1,395 (4.9%) | |

Note: Percentage increase from prior year shown in parentheses.

Table 2-2.

Permanent Population Projections for Nags Head
Under Different Assumptions

| <u>Year</u> | <u>Dare County</u> | <u>Nags Head</u> | | |
|-------------|--------------------|------------------|------------|-------------|
| | I | II | III | IV |
| | | <u>7.62%</u> | <u>10%</u> | <u>146%</u> |
| 1985 | 16,529 | 1,260 | 1,653 | 1,764 |
| 1990 | 19,521 | 1,488 | 1,952 | 2,509 |
| 2000 | 25,805 | 1,968 | 2,580 | 6,172 |
| 2010 | 32,053 | 2,444 | 3,205 | 15,183 |

- (I) Population estimates for Dare County from North Carolina State Data Center, Office of State Budget and Management.
- (II) 7.62% represents the share of the Dare County population that resided in Nags Head in 1980. This alternative projects Nags Head's future population based upon the Town's population remaining a constant percentage of the County's population.
- (III) Population estimate based upon the Town of Nags Head's population increasing to 10% of Dare County's total.
- (IV) Population estimate based upon 146% population increase observed from 1970 to 1980. This alternative assumes Nags Head will continue to grow by the same percentage that it grew between 1970 and 1980.

Land Availability and Potential Development

The Town of Nags Head contains approximately 4,600 acres. There existed in May, 1984, approximately 3,928 dwelling units in the Town, with the vast majority in low-density residential uses. Of these total dwelling units, some 3,633 are currently served by on-site septic systems with the remaining 295 units served by packaged treatment plants. Nags Head contains a number of platted lots which have not yet been developed. Specifically, there are 2,592 undeveloped platted lots, of which 1,883 are acceptable for development and connection to a conventional on-site septic system. The remaining 709 undeveloped platted lots include 127 lots that are completely unbuildable due to CAMA and the federal wetlands protection program. The remaining 582 lots are unbuildable with conventional septic systems due to unsuitable soils. These 582 lots may be built upon, however, if alternative methods of wastewater treatment and disposal are used. The fragile areas map on page 8 depicts the location of unsuitable soils and wetlands. The map also shows the small surface water supply watershed (AEC) around the Fresh Pond.

The total number of developed and undeveloped platted lots in Nags Head is 6,520. Of these, the total potential number of dwelling units is 5,811. An additional 582 dwelling units can be built, but located on lots considered unsuitable for the use of conventional septic systems (See Table 2-3).

In addition to these lots the Town contains land yet to be platted. The potential of unplatted parcels can be measured under two scenarios: (1) assuming the use of conventional septic systems at a density of 15,000 square feet per dwelling unit; and (2) assuming package wastewater treatment facilities at the maximum density permitted by the Town zoning ordinance.

As shown in Table 2-4, there are 1,526 acres in the Town of Nags Head which are unplatted, undeveloped, privately owned and subject to development. This acreage does not include Jockey's Ridge State Park or property in the Nags Head Woods owned by the Town or the Nature Conservancy. Nags Head Village (the Epstein tract), which contains 411 acres and is zoned SPD-C, already has an approved master plan allowing 1,798 dwelling units and 900 motel rooms. The remaining unplatted, undeveloped acres, if platted with 15,000 square foot lots, would result in 1,848 dwelling units served by septic systems.

If development on the unplatted and undeveloped parcels is served by package wastewater treatment facilities, the density of this development would be determined by the Nags Head Zoning Ordinance. One thousand, five hundred and twenty-six acres, including the Epstein tract, are available for development with the use of package facilities. At the permitted levels of density in the various zoning districts, 6,576 dwelling units could be built on currently undeveloped parcels, plus 900 motel rooms approved on the Epstein tract.

Fragile Areas Map

Table 2-3.

Buildout Factors for Unimproved Platted Lots (May, 1984)

| <u>District</u> | <u>Total Platted Lots</u> | <u>Acceptable Platted Lots*</u> |
|-----------------|---------------------------|---------------------------------|
| R-1 | 27 | 23 |
| R-2 | 1,229 | 909 |
| R-3 | 70 | 63 |
| CR | 108 | 73 |
| C-2 | 959 | 625 |
| SPD-20 | <u>199</u> | <u>190</u> |
| Total | 2,592 | 1,883 |

*Acceptable based on marginal or suitable soils and located outside of CAMA AEC.

| | |
|--|--------------|
| Existing dwelling units (from 1980 Land Use Plan plus building permits to May 1984) | 3,928 DU's |
| Unimproved platted lots | <u>2,592</u> |
| Total potential residential buildout on platted lots (on septic systems) | 6,520 DU's |
| Unacceptable platted lots | -709 |
| Wetland AEC lots | 80 |
| Ocean erodible AEC lots | 47 |
| Unsuitable soil lots | <u>582</u> |
| Estimated Residential Carrying Capacity (using septic systems on lots permitted by State regulations.) | 5,811 DU's |

Source: Nags Head Carrying Capacity Study, 1984.

Table 2-4.

Buildout Factors for Unimproved Unplatted Parcels (May 1984)

| <u>District</u> | <u>Total Unimproved Acreage</u> | <u>Unsuitable Acreage*</u> |
|-----------------|---------------------------------|----------------------------|
| R-1 | 95.3 | 31.5 |
| R-2 | 237.6 | 25.6 |
| R-3 | 25.2 | 0.0 |
| CR | 7.0 | 0.0 |
| C-2 | 90.8 | 17.1 |
| SPD-40 | 658.7 | 31.5 |
| SPD-C | <u>411.2</u> | <u>0.0</u> |
| Total Acres | 1,525.8 | 105.7 |

Note: This total does not include publicly-owned land.

*Unsuitable soil on entire parcel.

Residential Buildout at Densities from State Health Regulations
(based on 15,000 square foot lots for septic use)

| <u>District</u> | <u>Acreage</u> | <u>Buildout</u> |
|-----------------|----------------|-------------------------------|
| R-1 | 95.3 | 249 DU's |
| R-2 | 237.6 | 629 DU's |
| R-3 | 25.2 | 66 DU's |
| CR | 7.0 | 18 DU's |
| C-2 | 90.8 | 237 DU's |
| SPD-40 | 658.7 | <u>658</u> DU's |
| Subtotal | | 1,848 |
| SPD-C | 411.2 | 1,798 DU's |
| SPD-C | <u> </u> | <u>900</u> Motel rooms |
| Total | 1,525.8 | 3,646 DU's 900 Motel rooms |

Source: Nags Head Carrying Capacity Study, 1984.

Table 2-4. Continued

Residential Buildout for Unimproved Unplatted Parcels
at Maximum Permissible Densities
 (as found in the Zoning Ordinance May, 1984)

| <u>District</u> | <u>Acreage</u> | <u>Density Permitted</u> |
|-----------------|----------------|-------------------------------|
| R-1 | 95.3 | 2.9 DU/acre |
| R-2 | 237.6 | 3.9 DU/acre |
| R-3 | 25.2 | 18.0 DU/first acre |
| CR | 7.0 | 12.0 DU/all subsequent acres) |
| C-2 | 90.8 | |
| SPD-40 | 658.7 | 4.0 DU/acre as in approved |
| SPD-C | 411.2 | master plan |
| Total Acres | 1,525.8 | |

| <u>District</u> | <u>Acreage</u> | <u>Buildout</u> |
|-----------------|----------------|-------------------------------|
| R-1 | 95.3 | 249 DU's |
| R-2 | 237.6 | 834 DU's |
| R-3 | 25.2 | 272 DU's |
| CR | 7.0 | 72 DU's |
| C-2 | 90.8 | 980 DU's |
| SPD-40 | 658.7 | 2,371 DU's |
| Subtotal | | 4,778 |
| SPD-C | 411.2 | 1,798 DU's |
| SPD-C | | 900 Motel rooms |
| Total | 1,525.8 | 6,576 DU's 900 Motel rooms |

Note: Acreage here not constrained by septic regulations.

Source: Nags Head Carrying Capacity Study, 1984.

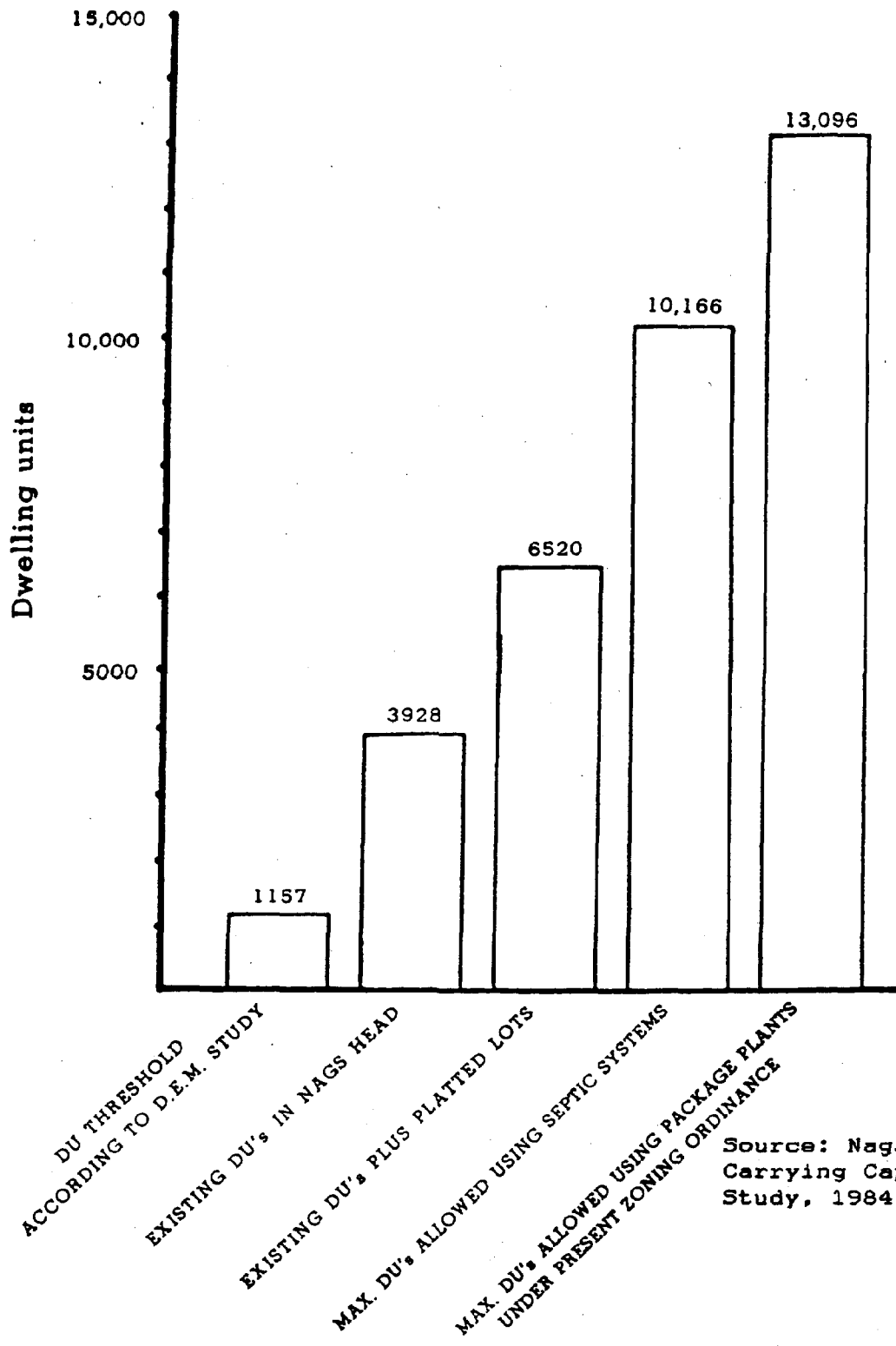
As described above, there are 582 unimproved platted lots in Nags Head which cannot be developed with the use of a septic system due to unsuitable soils. These lots may however be developed with the use of alternative on-site wastewater treatment technology. The two most widely-used methods of on-site wastewater treatment on unsuitable soils are low-pressure pipe systems and mound systems. These systems require approximately one acre per dwelling unit for use.

In summary, the total amount of residential development in Nags Head on currently platted lots, assuming no redevelopment at higher than existing densities, is 6,520 dwelling units, not including development on the approved Master Plan for the Epstein tract. Of these 6,520 potential dwelling units, there are 3,928 existing dwelling units and 2,592 are undeveloped lots. Approximately 709 of these lots face severe constraints to development, leaving a likely buildout between 5,811 dwelling units and 6,520 dwelling units.

Total buildout of the Epstein tract is 1,798 dwelling units and 900 motel rooms. The total residential buildout on unplatted parcels other than the Epstein tract is between 1,848 and 4,778 dwelling units. The total amount of buildout, including the Epstein tract, on unplatted parcels is between 3,646 dwelling units and 6,576 dwelling units, plus 900 motel rooms. As depicted in Figure 2-1, the total residential buildout in Nags Head is therefore between 10,166 dwelling units and 13,096 dwelling units, plus the 900 motel rooms in the Epstein tract.

Figure 2-1.

Maximum Number of Dwelling Units with Total Residential Buildout



Building and Development Trends

The density of actual construction that has occurred in Nags Head since April 1980 has been higher than the density permitted by the zoning ordinance. This is due to development on lots which were platted when the zoning ordinance allowed smaller lots.

The actual "market" buildout trend over the past five years indicates that buildout is occurring at maximum permissible densities or greater. In none of the zoning districts in Nags Head is development proceeding at a density appreciably less than the density permitted by the zoning ordinance (See Table 2-5). The only significant differences between maximum permissible buildout under the zoning ordinance and market trends over the past five years are due to the development of grandfathered lots in previously platted parcels.

During the five year period from 1975 through 1979, there were 526 residential and motel units built in Nags Head (See Table 2-6). From April 1980 through May 1984, there were approximately 897 residential and motel units built. The development over the past four years has consumed approximately 64 acres per year (See Table 2-5). With approximately 1,500 acres of undeveloped privately-owned land subject to development, and assuming a continuation of the recent development rate (64 acres per year), Nags Head will reach full buildout in approximately 23 years.

Increasingly, the more intense multi-family uses are locating in the Town. In addition, commercial development in the Town has increased substantially in the last five years. Table 2-7 lists the most recent commercial projects and the square footage of structures involved. The existing land use map, on page 18, shows the location of the Town's present development. Nearly all of the commercial development is located along the Croatan Highway and most of the multi-family and motel development is on the oceanfront. While the following tables describe the rate of growth, the existing land use map depicts the mixture of land uses throughout most of the Town.

Table 2-5.

Nags Head Building Activity
(April 1, 1980 - May 23, 1984)

| Zone | 4/1/80 to 12/31/80 | Calendar 81/82/83 | 1/1/84 to 5/23/85 | Period Total | Acres | Density (Dwelling Units/Acre) |
|-------|---------------------------------|-------------------|-------------------|----------------|---------------|----------------------------------|
| R-1 | | 8 SF | 3 SF | 11 SF | 3.8 | 2.9 |
| R-2 | 58 SF 2 D | 200 SF 17 D | 44 SF 2 D | 302 SF 21 D | 104.1 10.8 | 2.9 3.9 |
| R-3 | 5 SF | 8 SF | | 13 SF | 4.5 | 2.9 |
| CR | | 6 SF | 2 SF | 8 SF | 4.0 | 2.0 |
| | 1 D | 13 D | 1 D | 15 D | 11.1 | 2.7 |
| | | 41 MF | 45 MF | 86 MF | 6.5 | 13.2 |
| | | 69 MOTEL | 17 MOTEL | 86 MOTEL | 5.1 | 16.9 |
| C-2 | 25 SF | 61 SF | 9 SF | 95 SF | 16.3 | 5.8 |
| | 1 D | 1 D | | 2 D | 0.7 | 5.7 |
| | Other: Restaurant, retail, etc. | | | | 61.7 | |
| SPD | 1 SF | 13 SF | 10 SF | 24 SF | 11.4 | 2.1 |
| 20440 | 1 CHURCH | 1 NSB HOME | | | 17.0 | |

SF = Single Family Structure
D = Duplex Structure
MF = Multi-family Unit

Summary

Total New Construction, 4/1/80 through 5/23/84

| | | |
|---------------------------|-------------------|----------------|
| 453 Single Family DU's on | 144.1 acres, or | 3.1 DU's/acre |
| 76 Duplex DU's on | 22.6 acres, or | 3.4 DU's/acre |
| 86 Multi-family DU's on | 6.5 acres, or | 13.2 DU's/acre |
| Other | <u>83.8</u> acres | |

Total 257.0 acres

Total Residential Acreage 173.2 acres

Overall Residential Density 3.6 DU's/acre

Building Starts, Single Family, 1975-1979 (1980 LUP) 479

Building Starts, Single Family, 4/80 - 5/84 529

Source: Nags Head Carrying Capacity Study, 1984.

Table 2-6.

Residential and Motel Units 1975 - 1984

| <u>Year</u> | <u>Single-Family</u> | <u>Duplex</u> | <u>Multi-Family</u> | <u>Motel</u> | <u>Total Units</u> |
|-----------------|----------------------|---------------|---------------------|--------------|--------------------|
| 1975 | 38 | 0 | 0 | 0 | 38 |
| 1976 | 79 | 2 | 12 | 3 | 96 |
| 1977 | 124 | 2 | 18 | 6 | 150 |
| 1978 | 127 | 0 | 7 | 0 | 134 |
| 1979 | 108 | 0 | 0 | 0 | 108 |
| 1980 | 121 | 6 | 42 | 2 | 171 |
| 1981 | 109 | 22 | 16 | 19 | 166 |
| 1982 | 73 | 22 | 43 | 10 | 148 |
| 1983 | 112 | 28 | 18 | 59 | 217 |
| 1984 | 145 | 6 | 15 | 29 | 195 |
| 10-Year Average | 104 | 9 | 17 | 13 | 143 |

Source: Nags Head Planning and Development Department

Since 1974, the Town has experienced considerable commercial development (see Table 2-7). Four major shopping centers have been built (Surfside Plaza, 24,600 square feet; Nags Head Station, 18,000 square feet; Satterfield Landing, 44,700 square feet and the Outer Banks Mall, 138,600 square feet). In addition to four major shopping centers, seven restaurants were built in Nags Head between 1974 and 1985, with a combined square footage of 35,000.

In the future, local seasonal economy will determine to some extent the number of new commercial establishments in Nags Head. As the year-round residential population increases, the need for additional services and office space also will increase. The commercial character of the Town has changed over the last ten years from a community with no shopping centers, few restaurants and little office space to a community which can provide many of the amenities found in large cities.

Table 2-7.

Square Footage of Commercial Buildings Built or Remodeled in Nags
Head from 1975 through 1984

| Year | Restaurants | Retail | Entertainment | Service* | Office |
|---------------|-------------|-------------|---------------|-----------|-----------|
| 1975 | 0 | 13,600 (1) | 0 | 3,796 (1) | 384 (1) |
| 1976 | 4,290 (2) | 11,987 (3) | 4,440 (1) | 0 | 504 (1) |
| 1977 | 224 (1) | 39,038 (10) | 0 | 2,500 (1) | 108 (1) |
| 1978 | 3,000 (1) | 14,994 (8) | 5,160 (2) | 0 | 0 |
| 1979 | 0 | 13,670 (6) | 0 | 0 | 7,380 (2) |
| 1980 | 4,589 (2) | 19,281 (3) | 0 | 9,390 (2) | 0 |
| 1981 | 20,964 | 5,580 (2) | 20,428 | 37,960 | 7,360 (3) |
| 1982 | 1,240 (2) | 168,883 (8) | 3,196 (1) | 480 (2) | 2,964 (1) |
| 1983 | 3,458 (2) | 69,616 (4) | 0 | 1,705 (3) | 1,020 (2) |
| 1984 | 19,346 (4) | 5,347 (2) | 30,116 (3) | 0 | 880 (1) |
| 10-Year Total | 57,111 | 361,996 | 63,040 | 55,831 | 20,600 |

*Service includes Health Care Center, Banks, Churches, Nursing Home, Gas Stations.

Note: Number of building permits issued in parentheses.

Source: Nags Head Planning and Development Department

Existing Land Use Map

Seasonal Population

Making certain assumptions about the number of individuals residing in each dwelling unit and hotel/motel room in the Town allows us to estimate the potential seasonal peak population. Table 2-8 presents the methodology and calculations for this procedure, and indicates that under existing development, peak population can exceed 30,000 people.

The estimated number of residents during the peak period (e.g. when hotel/motel rooms are at full occupancy, and so on), is in stark contrast to the 1,500 or so permanent residents residing in the Town. It is clear that it is this peak or maximum population which must be considered for planning purposes.

In addition to the population estimates, existing development includes over 5,000 restaurant seats, nearly 600,000 square feet of retail structures, over 300,00 square feet of service establishments along with offices and warehousing.

Table 2-8.
Current Development and Estimated Intensities, July 15, 1985

| <u>Land Use</u> | <u>Current Land Use</u> | | <u>Current Development</u> | | <u>Potential Seasonal</u> | |
|--------------------|----------------------------------|--------------------------------------|---|--------------|---------------------------|---------------|
| | <u>Composition</u> | | | | <u>Population</u> | |
| | <u>Acres</u> <u>Developed</u> | <u>Percentage</u> <u>of Total</u> | <u>Average</u> <u>Intensities</u> <u>Per Acre</u> | <u>Total</u> | <u>Factors</u> | <u>Total</u> |
| <u>RESIDENTIAL</u> | | | | | | |
| SF | 516 | 65.8% | 3.9 DU/AC | 2402 DU's | 8 PEOPLE/DU | 19,216 |
| M/F | 33 | 3.5% | 7.8 DU/AC | 257 DU's | 6 PEOPLE/DU | 1,542 |
| <u>COMMERCIAL</u> | | | | | | |
| Restaurant | 37 | 3.9% | 139 SEAT/AC | 5143 SEATS | | |
| Motel/Cott | 126 | 13.4% | 22.7 UNIT/AC | 2860 UNITS | 3.5 PEOPLE/DU | 10,010 |
| Retail | 76 | 8.2% | 7673 SF/AC | 583,148 SF | | |
| Offices | 4 | 0.4% | 6328 SF/AC | 25,312 SF | | |
| Warehouse | 2 | 0.2% | 9680 SF/AC | 19,360 SF | | |
| Services | 43 | 4.6% | 8248 SF/AC | 354,664 SF | | |
| TOTAL | 936 | 100.0% | | | | 30,768 PEOPLE |

Source: Nags Head Planning and Development

Projecting the Impacts and Implications of Future Growth

As Nags Head continues to grow and develop, the size of its peak population will grow as well. The previous analysis of land availability, permissible development and building trends permits us to estimate the extent of future peak population and in turn demands placed upon the natural and man-made environment. Table 2-9 presents the likely peak population that would result from the maximum buildout, with the current composition of land uses. This results in a predicted peak population under complete buildout of over 100,000 people. Build out at the current composition of land uses also will produce almost 3 million square feet of service establishments and 1 million square feet of retail structures. In addition to office and warehouse development, buildout will produce almost 17,000 restaurant seats.

Table 2-9.

Future Total Buildout Under 1985 Composition of Land Uses

| <u>Land Use</u> | <u>Land Use Composition</u> | | | <u>Projected Intensities Population</u> | | | |
|--------------------|---|------------------------|--------------------------|---|--------------|-----------------|---------|
| | Projected Acreage for Development | Percentage of Total | Total Acres Developed | Intensity Per Site Acre | Total | Factors | Total |
| <u>RESIDENTIAL</u> | | | | | | | |
| SF | 1407 | 65.8% | 2023 | 3.9 DU/AC | 7890 DU's | 8 PEOPLE/DU | 63,120 |
| M/F | 76 | 3.5% | 109 | 7.8 DU/AC | 850 DU's | 6 PEOPLE/DU | 5100 |
| <u>COMMERCIAL</u> | | | | | | | |
| Restaurant | 84 | 3.9% | 121 | 139 SEAT/AC | 16,819 SEATS | | |
| Motel/Cott | 287 | 13.4% | 413 | 22.7 UNIT/AC | 9375 UNITS | 3.5 PEOPLE/UNIT | 32,813 |
| Retail | 175 | 8.2% | 251 | 7673 SF/AC | 1,925,923 SF | | |
| Offices | 9 | 0.4% | 14 | 6328 SF/AC | 88,592 SF | | |
| Warehouse | 3 | 0.2% | 5 | 9680 SF/AC | 48,400 SF | | |
| Services | 98 | 4.6% | 140 | 8248 SF/AC | 1,154,720 SF | | |
| Total | | | | | | | 101,033 |

Source: Nags Head Planning and Development Department

This projection can then be used to estimate the impacts on public services and facilities. Tables 2-10 through 2-13 below project the impacts of future growth to maximum buildout levels for several key community services and facilities. For instance, Table 2-10 indicates that water consumption under future total buildout will increase by over 200%, from 2,060 to 6,766 thousand gallons per day.

Table 2-10.

Existing and Projected Water Consumption
(thousands of gallons per day)

| <u>Land Use</u> | <u>Factors</u> | <u>Total under 1985 Development</u> | <u>Total under Complete Buildout</u> |
|--------------------|----------------|-------------------------------------|--------------------------------------|
| <u>RESIDENTIAL</u> | | | |
| SF | 435 GPD/DU | 1044 | 3432 |
| M/F | 326 GPD/DU | 84 | 277 |
| <u>COMMERCIAL</u> | | | |
| Restaurant | 35 GPD/SEAT | 180 | 587 |
| Motel/Cott | 213 GPD/UNIT | 609 | 1997 |
| Retail | 15 GPD/100 SF | 87 | 289 |
| Offices | 7.5 GPD/100 SF | 2 | 7 |
| Warehouse | 7.5 GPD/100 SF | 1 | 4 |
| Services | 15 GPD/100 SF | <u>53</u> | <u>173</u> |
| Total | | 2060 | 6766 |
| | | thousands GPD | thousands GPD |

Source: Nags Head Planning and Development Department

Table 2-11 indicates that the amount of solid waste generated by the community will increase by a similar extent under future total buildout. Specifically, the estimated cubic yards of solid waste per trash pick-up is projected to increase from 2,171 to 7,130.

Table 2-11.

Existing and Projected Trash Pick-up
(cubic yards per pick-up)

| <u>Land Use</u> | <u>Factors</u> | <u>Total under 1985 Development</u> | <u>Total under Complete Buildout</u> |
|--------------------|-----------------|-------------------------------------|--------------------------------------|
| <u>RESIDENTIAL</u> | | | |
| SF | 0.30 CYD/DU | 720 | 2367 |
| M/F | 0.50 CYD/DU | 129 | 425 |
| <u>COMMERCIAL</u> | | | |
| Restaurant | 0.05 CYD/SEAT | 257 | 841 |
| Motel/Cott | 0.14 CYD/UNIT | 400 | 1313 |
| Retail | 0.07 CYD/100 SF | 408 | 1348 |
| Offices | 0.02 CYD/100 SF | 5 | 18 |
| Warehouse | 0.02 CYD/100 SF | 4 | 10 |
| Services | 0.07 CYD/100 SF | <u>248</u> | <u>808</u> |
| Total | | 2171 | 7130 |
| | | cubic yards | cubic yards |

Source: Nags Head Planning and Development Department

Table 2-12 indicates that projecting existing assumptions concerning impervious surfaces into the future will also result in dramatic increases under total buildout. This projection has a significant impact on the Town's drainage systems, including ocean outfalls. Table 2-13 suggests that as the Town grows so also will its tax base. The Town's estimated existing tax base of approximately \$234 million is projected to increase to \$768 million under future total buildout.

Table 2-12.

Existing and Projected Square Footage of Impervious Surfaces

| <u>Land Use</u> | <u>Factors</u> | <u>Total under 1985 Development</u> | <u>Total under Future Buildout</u> |
|--------------------|----------------|-------------------------------------|------------------------------------|
| <u>RESIDENTIAL</u> | | | |
| SF | 1580 SF/DU | 3,795,160 | 12,608,400 |
| M/F | 1679 SF/DU | 431,503 | 1,427,150 |
| <u>COMMERCIAL</u> | | | |
| Restaurant | 168 SF/SEAT | 864,024 | 2,825,592 |
| Motel/Cott | 813 SF/UNIT | 2,325,180 | 7,621,875 |
| Retail | 365 SF/100SF | 2,128,490 | 7,029,618 |
| Office | 355 SF/100SF | 89,958 | 314,502 |
| Warehouse | 204 SF/100SF | 39,494 | 98,736 |
| Services | 316 SF/100SF | 1,120,738 | 3,648,915 |
| Total | | 10,794,547 (247 acres) | 35,260,286 (809 acres) |

Source: Nags Head Planning and Development Department

Table 2-13.

Existing and Projected Assessed Value of Structures
(millions of dollars)

| <u>Land Use</u> | <u>Factors</u> | <u>Total under 1985 Development</u> | <u>Total under Future Buildout</u> |
|--------------------|----------------|-------------------------------------|------------------------------------|
| <u>RESIDENTIAL</u> | | | |
| SF | \$ 50,000 DU | \$ 144.12 | \$ 473.40 |
| M/F | 45,936 DU | 11.80 | 39.05 |
| <u>COMMERCIAL</u> | | | |
| Restaurant | 1,320 SEAT | 6.79 | 22.20 |
| Motel/Cott | 15,500 UNIT | 44.33 | 145.31 |
| Retail | 2,700/100SF | 15.74 | 51.99 |
| Office | 2,900/100SF | 0.73 | 2.57 |
| Warehouse | 1,500/100SF | 0.29 | 0.73 |
| Services | 2,800/100SF | <u>9.93</u> | <u>32.33</u> |
| Total | | \$ 233.73 | \$ 767.58 |

Note: These estimated values are in 1985 dollars.

Source: Nags Head Planning and Development Department

These types of projections say little, however, about the capacity of the Town, and its natural and man-made environments, to accommodate growth demands. For instance, to estimate that local water consumption will triple in size at some point in the future does not address the question of whether this demand can be satisfied under the existing water supply and distribution system. Moreover, this type of analysis is value-neutral and does not establish whether such improvements, if needed to meet future demand, should even be made given the high economic and environmental costs which may accompany them and the desires of the community. A complete analysis of the impacts of growth should carefully consider these issues. More specific information concerning the "carrying capacity" of local environmental and man-made systems to accommodate these growth demands is contained in the chapters which follow in this plan. These chapters also identify local goals and policies which assist in determining when and to what extent growth demands can be satisfied, and at what economic, social and environmental costs.

Chapter 3.

Managing Growth in Nags Head

In the previous chapter we described the population and development growth trends that the Town of Nags Head is currently experiencing and expect to experience in the future. Along with this growth are numerous impacts and implications, from the increasing demands placed upon public services and facilities to the negative effects on the quality of the natural environment. Yet, Nags Head is not powerless in the face of these effects. Rather, through carefully guiding and managing of future growth the Town can minimize negative effects and maximize the benefits and opportunities growth presents.

Characteristics of Growth

Efforts to manage future growth can focus on one or more of the characteristics of this growth. At least five dimensions of growth can be identified and can be modified through public policy to achieve certain local goals: type, quality, density, location and timing. Each of these dimensions is briefly described below.

1. Type. Type of growth or development usually refers to the use to which land and space is put. Typical growth types include commercial and industrial, recreational, single family residential, multi-family, and so on. A growth management program may control the type of new growth occurring in the community, for instance, to preserve the community's residential character, to minimize incompatible uses and to avoid the negative effects of certain land use activities (e.g., noise, traffic, pollution).

Through tradition Nags Head has become a community dominated by single family structures. The Town can exercise control over the mix of land uses developing in the community through the zoning ordinance and zoning map.

2. Quality. The quality of growth usually refers to the construction and design of the development occurring in the jurisdiction. A community may wish, for example, to pursue building code amendments to ensure that the quality of construction is such that structures will withstand certain physical forces, such a hurricane force winds. Quality may extend, as well, to the aesthetic features of the structure, and the community may regulate the exterior design of buildings to preserve the visual and architectural integrity of the community. The amount of open space required around a building may be considered a question of quality.

3. Density. An important dimension of growth is the intensity or density with which it occurs over the entire community and on particular sites. A community may wish to control the density of development to protect natural resources such as ground water quality and estuarine areas. Controlling the density of development has implications for the generation of traffic, the consumption of water and demand for other public services and facilities, and the scenic and aesthetic quality of the community. The density at which a town develops has a profound impact on the community's character. Nags Head is characterized as a low density community.

4. Location. Certain uses and densities are appropriate in certain locations, while others are not. Consequently, a key dimension of growth which management programs are designed to influence is its location. For instance, while a community may decide that some identical uses are acceptable, placing them next door to residential neighborhoods may not be. To preserve the integrity of the beach and dune system in a locality or to reduce the amount of the Town at-risk in a hurricane, it may be necessary to locate development - and particularly higher density development - away from the oceanfront.

5. Rate. Depending upon the economic and other pressures experienced by communities, unmanaged growth may progress at a slow or fast pace. When growth demands are strong, and the resulting pace of growth is quick, the problems created by this growth may exceed the community's short term capacity to deal with it. Public services and capital facilities become strained, with cost-efficient expansion requiring additional time. Natural systems become taxed, with little opportunity for local officials to adequately assess these impacts and take appropriate mitigating actions. Consequently, a growth management program may attempt to better deal with these problems by moderating and controlling the permissible rate or pace of growth in the community. The recently adopted Water Tap Allocation Ordinance is a local example of controlling the rate of development in Nags Head.

Types of Growth Management Techniques

A number of specific growth management programs and policies can be employed to modify the above characteristics of growth to achieve community goals. Six types or categories of growth management programs are briefly mentioned here: (1) plans, (2) development regulation, (3) capital facilities policy, (4) land and property acquisition, (5) taxation, fiscal and other incentives, and (6) information dissemination. The reader will note that each of these types is represented in the policies and implementing proposals contained in the subsequent chapters of this plan.

1. Plans. The Nags Head land use plan at its most general level falls into this category. Plans represent the preparation of guiding frameworks for making future decisions. Less comprehensive plans can serve to guide and implement a larger plan. In subsequent chapters, for instance, the capital improvements program, and post-hurricane reconstruction plan, are discussed as approaches to addressing and implementing the goals set forth in this plan.

In addition to the 1980 land use plan, which this plan updates, there exists in Nags Head a Surface Water Drainage Plan. It identifies drainage basins, corridors and depicts problem areas. The drainage plan is used in reviewing proposed development plans.

2. Development regulations. The tools and techniques included in this category are those which seek to manage growth by directly regulating it. Included here are traditional regulating devices such as zoning and subdivision ordinances, as well as more innovative programs such as the use of performance standards and bonus and incentive zoning. The Town recently adopted a Water Tap Allocation Ordinance intended to pace the rate of development with the ability to develop a new water supply. The Nags Head Village Zoning Ordinance is another local example of an innovative regulation. This ordinance is designed to facilitate bonus and incentive zoning, cluster housing, shared common areas and other techniques to enhance the quality of development. The Area of Environmental Concern (AEC) program under CAMA is an example of a shared state-local regulatory growth management program through the issuance of major and minor CAMA permits.

One development control technique which represents a new land use approach and could be implemented in Nags Head involves the transfer of development rights from one parcel of land to another parcel of land. The transfer of development rights (TDR) concept is a simple idea. In TDR, a number of development rights (density rights) is assigned to each land owner and a market is established for exchanging or transferring these rights among owners. Development is allowed in some areas and restricted in others, in environmentally sensitive areas, for example. The quantity and distribution of development rights is determined so that the realization of the full development potential by the owners of developable property requires them to augment their own supply of development rights by buying development rights from those who own land on which development is restricted.

The TDR system can lead to more effective preservations of environmentally sensitive areas, open spaces, landmarks and historic districts along with a more efficient use of land earmarked for development. Implementation of the TDR system, however, would require considerable staff time and public acceptance.

3. Capital facilities policy. Many of the goals of managing growth can be accomplished through decisions concerning the expenditure of public monies. For instance, a locality may be able to redirect growth away from a particularly sensitive environmental zone, by locating critical public services such as sewer and water in other less sensitive locations. As a further example, a locality may decide not to construct a public road to an undeveloped part of town to prevent the future growth pressures that such an investment would create. Nags Head, in conjunction with the Town of Kill Devil Hills and Dare County, recently expended funds to increase the water treatment capacity of the regional water system. The impact of this decision is to allow the area to continue developing.

4. Land and property acquisition. In many cases the most effective way in which a locality can advance its growth management objective is through the public acquisition of land and property. The community may wish to preserve a pristine natural area, subject to intense development, through public acquisition. Acquisition is typically used to secure lands for recreational and other public uses. Acquisition may also be applied to structures and development properties, for instance when a locality intervenes to purchase an architecturally significant building threatened by existing patterns of development. Nags Head purchased land in 1981, for a public beach and maintains ownership of 250 acres, most of which is a maritime forest or watershed preserve.

5. Taxation, fiscal and other incentives. Growth can also be directed and managed through taxation and other fiscal incentives. This category includes mechanisms designed to influence private development in a more indirect fashion. For instance, preferential property tax assessment for certain desirable land uses (e.g., agricultural lands, open space) may reduce the private costs of holding these lands in an undeveloped state, and thus reduce their chance of development. As a further example, site value taxation might be used to increase the holding costs of underdeveloped land in areas where development is denied by the community, inducing more compact and contiguous forms of growth, and deflecting growth pressures away from rural and less suitable development locations. While not under control of the Town, the federal flood insurance program provides an example of financial incentive. Homeowners employing sturdier construction standards can get reduced insurance premiums. While the Town is not using fiscal incentives to guide growth, it may deserve consideration to implement an open space plan.

6. Information dissemination. Classical economic theory suggests that consumers will make more informed decisions about development and the use of land if they are given more complete information. Programs in this category, then, involve efforts to convey to consumers and the public certain crucial information.

For instance, a community may attempt to discourage future development in high storm hazard areas by requiring the explicit disclosure of this hazard to potential purchasers of land or property in these areas. As a further example, a community may attempt to bring about more environmentally sensitive building practices by distributing information and data concerning the environmental degradation normally incurred by the community.

The Town of Nags Head has produced several reports that disseminate information about development. A Carrying Capacity Report analyzes the Town's capacity to absorb growth in terms of hurricane evacuation, water, sewage treatment and land availability. The Hurricane Hazard Mitigation and Post-Storm Reconstruction Report address the threats of severe storms and hurricanes and depicts high hazard areas. The results of a public opinion survey are cataloged in a report entitled 1984 Land Use Survey. This document conveys the attitudes and preferences of Nags Head's permanent and seasonal residents. A final document, Storm Drainage Design Manual, explains to developers ways of managing stormwater runoff.

Modifying the Characteristics of Growth in Nags Head

The above discussion indicates that communities are not powerless against the pressures of growth. Rather, as we have suggested, there are both a number of different dimensions to growth which can be modified or managed, and numerous growth management programs available for doing this. In this section we will briefly illustrate how Nags Head can modify growth trends, and the implications of doing so.

To illustrate how the Town can control the impacts of growth, we will return to the estimates of population and development under the future total buildout scenario, described in Chapter 2. We will compare the projected results of modifying one or more dimensions of growth with the future total buildout under current circumstances (i.e., no change from current land use).

Consider, for example, the possibility of shifting more of the Town's available acreage to single family residential uses. What are the implications of doing this? Table 3-1 below indicates that Scenario II, as we will call it, increases the acreage in single family residential uses to 81% of the total Town average, as compared with only 66% under the buildout scenario which assumes the existing land use composition (what we will refer to as Scenario I). This would be accomplished by reducing the amount of acreage in other uses, such as commercial and multi-family residential.

Table 3-1.

Acreage Comparison of Scenarios I and II

| Land Use | Buildout Acreage Assuming 1985 Land Use Composition | Buildout Acreage Assuming Increasing Amount Single Family Residential |
|--------------------|--|--|
| | (Scenario I) | (Scenario II) |
| <u>RESIDENTIAL</u> | | |
| SF | 2023 (66%) | 2500 (81%) |
| M/F | 109 (4%) | 50 (2%) |
| <u>COMMERCIAL</u> | | |
| Restaurant | 121 (4%) | 70 (2%) |
| Motel/Cott | 413 (13%) | 239 (8%) |
| Retail | 251 (9%) | 130 (4%) |
| Offices | 14 (.59%) | 5 (.2%) |
| Warehouse | 5 (.2%) | 2 (.06%) |
| Services | <u>140 (5%)</u> | <u>70 (2%)</u> |
| Total | 3076 | 3076 |

Table 3-2.

Effects of Increase in Single Family Residential

| | <u>Scenario I</u> | <u>Scenario II (increased SF)</u> |
|------------------------------|-------------------|-----------------------------------|
| Peak population | 101,033 | 99,797 people |
| Water consumption | 6,766 | 6,130 thousands GPD |
| Trash pickup | 7,130 | 5,518 cubic yard per pickup |
| Impervious surfaces | 35,260,286 | 27,853,048 square feet |
| Assessed value of structures | \$ 767.58 | \$ 747.60 million |

The consequences of modifying the existing land use configuration in favor of increasing single family residential would have mixed results depending upon the goals established as important by the Town. While Scenario II (increased single family residential) would decrease somewhat the peak population in the Town, it would result in substantial reductions in water consumption, solid waste disposal demand, and the amount of impervious surfaces in the Town. Scenario II also leads to a reduction in the Town's tax base, which may or may not be perceived as a problem.

Now consider a scenario in which the amount of commercial acreage under total buildout is increased and the amount of single family residential is reduced (Scenario III). As Table 3-3 below indicates the amount of commercial acreage under the new scenario constitutes about 41% of the total acreage, compared with about 32% under Scenario I. Moreover, the proportion of total acreage in single family residential drops from 66% in Scenario I to 55% in Scenario III.

Table 3-3.

Acreage Comparison of Scenarios I and III

| Land Use | Buildout Acreage Assuming 1985 Land Use Composition | Buildout Acreage Assuming Increase in Commercial/Decrease in Single Family |
|--------------------|--|---|
| | (Scenario I) | (Scenario III) |
| <u>RESIDENTIAL</u> | | |
| SF | 2023 (66%) | 1702 (55%) |
| M/F | 109 (4%) | 108 (4%) |
| <u>COMMERCIAL</u> | | |
| Restaurant | 121 (4%) | 120 (4%) |
| Motel/Cott | 413 (13%) | 412 (13%) |
| Retail | 251 (9%) | 451 (15%) |
| Offices | 14 (.5%) | 22 (.7%) |
| Warehouse | 5 (.2%) | 6 (.2%) |
| Services | <u>140 (5%)</u> | <u>254 (8%)</u> |
| Total | 3076 | 3075 |

Table 3-4.

Effects of Increase in Commercial
Decrease in Single Family Residential Acreage

| | <u>Scenario I</u> | <u>Scenario III</u> |
|----------------------------|-------------------|-----------------------------|
| Peak population | 101,033 | 90,968 people |
| Water consumption | 6,766 | 6,595 thousands GPD |
| Trash pickup | 7,130 | 8,493 cubic yard per pickup |
| Impervious surfaces | 35,260,286 | 42,212,569 square feet |
| Assess value of structures | \$ 767.58 | \$ 761.20 million |

The results of Table 3-4 indicate that such an increase in commercial, and a corresponding decrease in single family residential, would result in a substantial reduction in peak population and water consumption, yet an increase in the demand for solid waste disposal and impervious surfaces. Under Scenario III, the amount of assessed valuation would decrease somewhat. Modifying these patterns of land use, then, will result in different types and levels of impacts and service demands. Which scenario is preferable will depend upon the goals and priorities of the community.

The implications of controlling the rate of growth can also be illustrated through the use of these scenarios. In Scenario IV the amount of development permissible by 1995 is controlled through the issuance of limited water tap permits, under the Town of Nags Head's new Water Allocation Ordinance. Table 3-5 presents a comparison between the expected development levels under the 1995 water tap scenario (Scenario IV) and the total future buildout scenario (Scenario I).

While total future buildout is not likely to occur within ten years, it can occur in 23 years under the current development rate. The water tap scenario, however, imposes a specific limit on the rate of town growth and will delay the time of total buildout.

Table 3-5.

Density Comparisons Between Scenarios I and IV

| Land Use | Intensity Per Site Acre | Total Density Buildout Assuming 1985 Land Use Composition | 1995 Under Water Tap Allocation Ordinance |
|--------------------|----------------------------|--|--|
| | | (Scenario I) | (Scenario IV) |
| <u>RESIDENTIAL</u> | | | |
| SF | 3.9 DU/AC | 7,890 DU's | 3,758 DU's |
| M/F | 7.8 DU/AC | 850 DU's | 454 DU's |
| <u>COMMERCIAL</u> | | | |
| Restaurant | 139 SEAT/AC | 16,819 SEATS | 6,392 SEATS |
| Motel/Cott | 22.7 UNIT/AC | 9,375 UNITS | 3,321 UNITS |
| Retail | 7,673 SF/AC | 1,925,923 SF | 895,078 SF |
| Offices | 6,328 SF/AC | 88,592 SF | 174,483 SF |
| Warehouse | 9,680 SF/AC | 48,400 SF | 25,234 SF |
| Services | 8,248 SF/AC | 1,154,720 SF | 810,326 SF |

Table 3-6.

Effects of Restricting Rate of Future Growth

| | <u>Scenario I</u> | <u>Scenario IV</u> |
|------------------------------|-------------------|------------------------------|
| Peak population | 101,033 | 44,410 people |
| Water consumption | 6,766 | 2,985 thousands GPD |
| Trash pickup | 7,130 | 3,372 cubic yards per pickup |
| Impervious surfaces | 35,260,286 | 16,972,290 square feet |
| Assessed value of structures | \$ 767.58 | \$ 358.55 million |

As expected, Scenario IV yields much lower levels of peak population, water consumption, trash pickup demand, impervious surfaces and assessed property valuation. This illustrates how controlling the rate of growth may prevent rapid buildout, and may minimize the urgency of the tremendous service demands, and pressures on the natural and man-made environments. Although the water tap scenario is intended to depict the results of phased growth, it also illustrates what the results might be of placing an absolute cap on development and growth in the Town - in this case at roughly the 44,000 peak population level. Such an absolute limitation on future growth would prevent any future increases in demands for such services as water consumption and solid waste disposal, and would limit any further pressures on such limited collective resources such as ground and surface water quality and evacuation capacity.

As stated in the previous chapter, illustrations of the demands of growth under different development scenarios say little about the capacity of the natural and man-made environments to accommodate them. Nor does this type of analysis indicate which impacts of growth - negative or positive - are important or acceptable to the community. If protecting the natural coastal environment is not an important goal to the community, for example, then there may be little reason to modify the characteristics of growth to prevent its impact in this area. These are questions addressed in subsequent chapters of the plan.

Chapter 4.

Shoreline Management and Protection

- A. Strategies for Addressing Erosion
- B. Public Access to the Shoreline
- C. Public Use of the Shorelines

Problem Statement

The Town of Nags Head depends heavily on its proximity to the water. It is the Town's ocean and sound shorelines which bring people to the community and which provide the basic recreational and aesthetic amenities fundamental to Nags Head's existence. As growth continues in the Town, the pressures placed upon the use and development of these shoreline will increase dramatically. The Town believes it must take an active role in managing and protecting these shoreline resources.

Problems arise when developers fail to understand or acknowledge that barrier islands are dynamic and ever-changing environments. Barrier islands have been shown to migrate (e.g. Kaufman and Pilkey, 1977) and are subject to a complex and numerous set of natural forces (e.g. washover processes, littoral drift, inlet formation, dune and beach dynamics), and are further modified by storms and hurricanes. Coastal erosion, both as a result of normal offshore littoral patterns, the occurrence of hurricanes and storms, and the general sea level rise which has been occurring (Titus, 1985), make development along the shores of barrier islands particularly tenuous.

In the past, problems have arisen by allowing the construction of immovable buildings along the ocean shore, necessitating the expenditure of public funds to protect these structures when natural forces threatened them. Several methods have been used to stabilize the ocean beach. Primary among them are: (1) sand moving programs (e.g., beach nourishment, sand pushing), (2) sand trapping structures (e.g. groins, jetties) and (3) shoreline protection works (e.g. bulkheads, seawalls, revetments.).

Beach nourishment programs involve efforts to push or place sand onto the beach in an attempt to build back former dunes and upper beach. Because most beach renourishment programs involve only the upper reaches of the beach, they increase its slope, and can actually increase the rate of erosion. Moreover, beach nourishment projects are typically very expensive and the results very temporary. A single northeaster may eliminate much of the sand deposited under a nourishment program. Beach nourishment programs, however, represent efforts to preserve oceanfront property without damaging neighboring property or destroying the public's use of the beach.

Groins and jetties are structures built perpendicular to the shoreline. Jetties are often very long and intended to keep sand from filling in inlets and shipping channels. Groins are smaller and attempt to trap sand flowing in the littoral current. Such structures are expensive, unsightly and cause extensive erosion problems down-current, as they rob these beach areas of the natural sand replenishment they would normally receive.

Shoreline protection works, such as seawalls and revetments, are built parallel to the coastline and are designed to shield directly shoreline property from the ocean forces. The City of Galveston, Texas, for instance, has constructed a 17-foot seawall, which protects its urbanized area. Such structures, however, reflect wave action, and intensify currents which steepen the profile of the beach and damage the property beyond the ends of the structure. In the long run these structures serve to destroy or seriously undermine the beach, require continual maintenance and investment and are largely ineffective at protecting property from shoreline processes without perpetual nourishment of the beach seaward of the hardened shoreline, the portion of the beach available to the public would soon erode away. Moreover, these structures are extremely costly to build. Recognizing the inappropriateness of such shore hardening devices, the Coastal Resources Commission has recently adopted a CAMA amendment outlawing their use of North Carolina ocean beaches.

A more responsible approach is to acknowledge the natural processes and dynamics of the shoreline and to manage growth accordingly. The location, density and figuration of development can be modified to take into consideration these valuable and important resources and to respect their natural processes. Results from the 1984 land use survey tend to support this position. When asked about shoreline erosion prevention measures only 17% of the respondents expressed support for such measures as building seawalls and pumping in sand that would permit increased building density on the beach. However, almost half of the respondents (46%) said they would like to see increased setbacks and high density development off the beach.

Disallowing the hardening of the shoreline will preserve the public beach, which is defined as the beach which exists between low and high water lines of the ocean. While this provides the public with a means of enjoying the ocean shoreline, it is hardly enough to adequately satisfy the demand for public enjoyment. The preservation of the public beach should be accompanied with acquisition and development of public lands and accessways on both the ocean and sound shorelines. This subject is further discussed in Chapter 12.

Goal

It is the goal of Nags Head to protect its shoreline resources, and to interfere as little as possible with the natural processes and dynamics at work in these areas.

Policies

1. It is the policy of the Town to encourage future motel and commercial development constructed of steel and concrete to locate west of the beach road.

2. It is the policy of the Town that no person or legal entity shall be permitted to build a seawall, jetty, groin or other artificial device designed to stabilize the ocean shoreline. The Town supports the CAMA provisions which prohibit the use of shore-hardening devices in these areas.

3. The Town opposes any shoreline management strategy that damages abutting property or endangers the public beach.

4. Beach nourishment, the movement of sand on a particular site, and the use of sand bags are permitted by the Town, but only when they do not interfere with access to and use of the beach by the public.

5. The Town believes that a healthy dune system is important and shall take all actions to preserve and enhance this system. This will include regulating development to minimize its impacts of the dune system.

6. The Town encourages measures other than hard structures, such as groins or bulkheads, being constructed on the estuarine shoreline for the purpose of temporarily stabilizing the estuarine shoreline.

7. The Town places a very high priority on the provision of public access to and public use of the ocean and sound shorelines.

8. It is the policy of the Town that movement of beach sand out of the beach-dune system should be prohibited.

Chapter 5.

Hurricane and Coastal Storm Hazard Mitigation

- A. Mitigation of Storm Hazards Prior to the Storm
- B. Reconstruction after a Severe Storm

Problem Statement

Hurricanes and severe coastal storms represent serious threats to life and property on the North Carolina coast. North Carolina is second only to Florida among Atlantic coast states in the number of hurricanes striking the mainland. Between 1890 and the present, North Carolina experienced 22 hurricanes, or an average of approximately one hurricane every four years (Neumann et al., 1978, updated for Hurricane Diana). In addition to hurricanes, Nags Head is subject to tropical storms and northeasters, such as the devastating Ash Wednesday storm of 1962. Hurricanes and coastal storms create severe conditions of high winds, flooding and wave action.

Collective response to hurricanes and severe storms might be conceptualized in terms of four primary phases: (1) pre-storm mitigation, (2) warning and preparedness, (3) response and (4) recovery and reconstruction. This chapter of the plan deals with the first and last of these stages, and divides the discussion and policy statements accordingly. Issues of hurricane preparedness and evacuation regarding traffic and transportation in Nags Head are discussed in Chapter 6.

Vulnerability to hurricane and storm hazards can be assessed first by analyzing the nature and location of physical hazards, and then by estimating the extent to which people and property are exposed to these forces. These assessments are provided below in brief fashion. A more extensive analysis is provided in the 1984 Hurricane Hazard Mitigation and Post-Storm Reconstruction Plan.

Location of storm hazard areas

There are two approaches to delineating areas that are vulnerable to coastal storms. One uses proximity to the ocean; the other uses topography or elevation of the land above mean sea level. Because both have validity, both are explored. Again it should be noted that currently the North Carolina coast is being studied under a hurricane simulation model known as SLOSH (Sea, Lake and Overland Surges from Hurricanes). When this study is completed it will provide detailed information concerning the location and intensity of hurricane forces under different storm assumptions, and this data should be incorporated into the Nags Head plan at a future date.

Map 5-1 depicts the high hazard areas of the Town which includes flood zones, the 300-foot setback area from the ocean and incipient inlets. Map 5-1 also delineates the ocean hazard Area of Environmental Concern (AEC). Not shown on Map 5-1 is a 75-foot estuarine shoreline AEC. This map and the collection of data presented below are based upon the flood zones as designated at the time this plan was prepared (Flood Hazard Boundary Map [FHBM] #4-01-07, dated October 17, 1975). It is expected that the National Flood Insurance Program will soon change the Nags Head flood insurance rate map. This plan should be updated in the future after the new flood map is adopted to reflect new flood zones.

Hazard Area Map

300-foot zone

Dr. Neil Frank, Director of the National Hurricane Center, and other hurricane experts have argued that experience shows that the most extensive damages from hurricanes occur within 300 feet of the ocean. While this is more a "rule of thumb" than a scientifically-established hazard zone, it nonetheless represents a useful guide for measuring extent of property at risk and appropriate mitigation measures. In Nags Head, Virginia Dare Trail in most places is just west of the 300-foot zone.

Flood zones (National Flood Insurance Program) Note: All flood zones are based upon Flood Hazard Boundary Map (FHBM) #4-01-07, dated October 17, 1975.

V-zone/Coastal High Hazard Zone. This zone delineates areas of the Town which will be subject to substantial wave action during a 100-year storm (technically, areas of the coast which could be subjected to waves three feet high). The V-zone constitutes a stretch of oceanfront from the southern to the northern borders of the Town. It extends inland furthest in the southern portion of the Town (south of the causeway). Here most land east of the beach road is in the V-zone. Lesser amounts of beachfront are in the V-zone north of the causeway, with the V-zone extending approximately 200 to 300 feet inland. No V-zones have been designated on the sound side.

A-zone/100-year Flood. This zone delineates those areas in the community which have an annual probability of one percent of being flooded (i.e., areas which will be inundated by the 100-year flood). In Nags Head, these zones are located over much of the jurisdiction. Specifically, these areas include most of the land south of Jockey's Ridge (south of Soundside Road), including Cedar and Pond islands. In addition, in the northern sector of the Town, much of the land between the Bypass and the beach road is in the A-zone, as well as the largely undeveloped Nags Head Woods.

B-zone/100- to 5--year Flood. These are areas where the chances of inundation are substantially less in any given year. In Nags Head this zone constitutes a continual line located along the dune ridge on the oceanfront side. It should be noted, however, that much of this area lies within the 300-foot zone.

C-zone/Areas of Minimal Flooding. These are areas where flooding is unlikely but are included in the analysis to complete the picture of the Town. These are areas of relatively high elevation and extend from Jockey's Ridge north and west of the Bypass, to the Town's northern boundary (excluding the estuarine area to the west).

Whalebone Junction/Incipient Inlet

In any major storm or hurricane, the formation of new inlets is a possibility. While the prediction of inlet formation and their precise locations is highly uncertain, particular physical features can be used to identify likely sites. Lynch (1983), in a recent analysis of potential inlets on the North Carolina coast, identified one location in Nags Head where such an inlet might form in the event of a major storm. This incipient inlet was identified based on several factors: maximum elevation, island width, canal dimensions, and rate of erosion. Width and elevation of a barrier island appear to be the most important factors.

The potential Nags Head inlet identified by Lynch is a canal which enters the island near Whalebone Junction (9USGS Quad - "Roanoke Island" Lat. N 35 5.44', Long. W 75 35.8'). Lynch calls this site "extremely hazardous," based on a composite of several crucial primary and secondary factors:

Primary factors:

| | | |
|-------------------|-------|---------------------|
| Island width | 2000' | Extremely hazardous |
| Maximum elevation | 17.5' | Dangerous |

Secondary factors:

| | | |
|----------------|------------|-----------|
| Lagoon width | 10.1 miles | Hazardous |
| Canal approach | 1600' | Dangerous |
| Canal width | 100' | Hazardous |
| Erosion rate | 0.3'/year | Dangerous |

Source: Lynch, 1983.

Drawing a straight line across the island from this canal and placing a 425-foot erodible area on each side of this line yields an incipient inlet hazard zone.

Although not identified by Lynch, local experience indicates that there are two other areas that should be considered.

Nags Head Cove/Incipient Inlet

A second potential inlet has been identified in the Nags Head Cove area. Here finger canals have been excavated from the sound side approximately 1,000 feet perpendicular to the shoreline. This means that storm waters from the sound would have a clear funnel traversing the island more than halfway to the ocean. This represents a serious inlet threat, and unfortunately is located in the center of a large subdivision. Extending the path of the longest canal to the Atlantic Ocean, and placing a 325-foot erodible area on each side of this line, yields an identifiable

hazard zone. This is a crude delineation, as is the case with the other incipient inlets, and is meant only to provide decision makers with a general idea of the geographical area of concern.

Soundside Road/Incipient Inlet

A third potential inlet can be identified in the Soundside Road area just south of Jockey's Ridge State Park. This area has been identified because of its relatively frequent flooding. Extending the path of this road, and placing a 100-foot erodible area on each side yields an identifiable, albeit crude, hazard zone.

Magnitude of Risk

Hurricane and storm forces would not be a problem for man if people and property were not exposed to them. In developing the Nags Head hurricane mitigation plan an extensive estimation of the property-at-risk in each of the hazard zones identified above was conducted. Within the 300-foot zone, it was found that some \$53 million (assessed valuation) in buildings is at-risk, with single family residences and hotel/motel uses comprising the largest categories. (See Table 5-1.) While encompassing fewer structures than the 300-foot line, the V-zone represents the area of greatest hazard under the National Flood Insurance Program (NFIP) mapping system. Estimates indicate that about \$27 million in buildings is located in these areas. Single family structures are the predominant use in this area, comprising about 96% of the assessed values of structures at-risk in this zone.

Within the A-zone are located 1,126 structures, with an assessed value of \$61 million. Again, the majority of this property is in single family structures, with duplexes/multi-family uses, hotel/motel, commercial and industrial also comprising substantial amounts. The amount of property found in the B-zone is considerably less, with \$33 million in buildings. Single family remains the primary use, with hotel/motel uses also assuming a major portion of the property value. Finally, some \$19 million in building value is at-risk in the C-zone.

Table 5-2 provides a cumulative summary of the private property at-risk in each of these different hazard zones. It indicates that some \$65 million in building value, or 1,120 structures, are at-risk in either the V-zone or the 300-foot zone. This could be considered the most vulnerable portion of the Town. As well, some \$117 million in private building value is at-risk by lying in either the 300-foot zone, the V-zone or the A-zone.

Table 5-3 indicates the private property at-risk in the three incipient inlet areas. Since it is impossible to project which, if any, of these might occur as a result of a hurricane, they are not incorporated into the cumulative summary in Table 8-2. Since the incipient inlets lie almost entirely within the A-zone, they are already included in any calculations which include that zone and may be added to any that do not, in order to calculate vulnerability including incipient inlets.

Table 5-1

Assessed Value of Real Property Within 300 Feet of the Ocean

| | Number of Buildings | Value | Number of Parcels | Value | Total Value |
|-----------------|---------------------|--------------|-------------------|--------------|---------------|
| Single family | 573 | \$34,447,900 | 831 | \$39,823,700 | \$74,271,600 |
| Mobile home | 0 | 0 | 0 | 0 | 0 |
| Duplexes, etc. | 49 | 2,882,400 | 54 | 1,441,800 | 4,324,200 |
| Multi-family | 18 | 701,800 | 19 | 4,989,600 | 5,691,400 |
| Commercial | 15 | 1,277,900 | 16 | 564,000 | 1,841,900 |
| Motel/hotel | 71 | 11,387,300 | 81 | 2,652,200 | 14,039,500 |
| Shopping center | 0 | 0 | 0 | 0 | 0 |
| Nursing home | 0 | 0 | 0 | 0 | 0 |
| Municipal | 0 | 0 | 0 | 0 | 0 |
| School | 0 | 0 | 0 | 0 | 0 |
| Theater | 0 | 0 | 0 | 0 | 0 |
| Industrial | 30 | 2,619,700 | 31 | 753,000 | 3,382,700 |
| Total | 856 | \$53,317,000 | 1,032 | \$50,234,300 | \$103,551,300 |

Source: Nags Head Hurricane Hazard Mitigation Report, 1984.

Table 5-2

Cumulative Summary of Real Property in 300-Foot and Flood Hazard Zones

| | Number of Buildings | Value | Number of Parcels | Value | Total Value (%) |
|--|---------------------|--------------|-------------------|--------------|---------------------|
| 300-Foot Zone | 856 | \$53,317,000 | 1,032 | \$50,234,300 | \$103,551,300 (40%) |
| 300 Feet + V beyond | 1,120 | 65,289,900 | 1,382 | 59,564,700 | 124,854,600 (48.5%) |
| 300 Feet + V & A beyond | 2,143 | 117,431,600 | 3,231 | 100,233,700 | 217,665,300 (85%) |
| 300 Feet + V, A & B beyond | 2,233 | 120,980,800 | 3,364 | 102,489,000 | 223,469,800 (87%) |
| 300 Feet + V, A B & C beyond (Total) | 2,562 | 139,720,800 | 4,004 | 117,775,000 | 257,495,900 (100%) |

Source: Nags Head Hurricane Hazard Mitigation Study, 1984

Note: Flood zones based on FHBM #4-01-07, 10/17/75.

Table 5-3.

Assessed Value of Real Property At-risk in Incipient Inlets

| | Assumed Width | Number of Buildings | Value | Number of Parcels | Value | Total Value |
|--------------------|---------------|------------------------|-------------|----------------------|-------------|-------------|
| Whalebone Junction | 850 | 2 | \$109,400 | 10 | \$342,300 | \$ 451,700 |
| Soundside Road | 200 | 30 | 636,600 | 51 | 617,200 | 1,253,800 |
| Old Nags Head Cove | 650 | 21 | 977,000 | 45 | 767,100 | 1,744,100 |
| Total | | 53 | \$1,723,000 | 106 | \$1,726,600 | \$3,449,600 |

Source: Nags Head Hurricane Hazard Mitigation Study, 1984.

Note: Flood zones based on FHBM #4-01-07, 10/17/75.

As part of the risk analysis the extent of public property at-risk in hazard zones was also estimated. This information is presented in Table 5-4.

Table 5-4

Public Investment Vulnerable to Storm Damage

A. Length of Water Mains in Flood Zones (feet)

| Zone | 24" | 14" | 12" | 8" | 6" | 4" | 2" |
|----------|---------|-----|--------|--------|--------|-------|-------|
| V | 0 | 0 | 0 | 0 | 6,850 | 1,850 | 6,500 |
| A | 33,070* | 230 | 26,200 | 32,100 | 57,880 | 0 | 5,440 |
| B | 0 | 0 | 8,350 | 250 | 0 | 0 | 200 |
| 300-foot | 0 | 0 | 0 | 0 | 2,300 | 250 | 1,330 |

* Transmission line for regional water system on west side of Bypass.

B. Length of Water Mains in Incipient Inlets (feet)

| | | | | | | | |
|-----------------------|-----|---|-----|-------|-------|-----|-------|
| Soundside | 500 | 0 | 500 | 6,200 | 500 | 0 | 0 |
| Old Nags Head Cove | 500 | 0 | 500 | 0 | 3,200 | 0 | 1,300 |
| Whalebone | 500 | 0 | 500 | 0 | 500 | 250 | 0 |

C. Length of Public Streets in Flood Zones

| Zone | Street Length (Feet) |
|------|----------------------|
| V | 10,500 |
| A | 134,900 |
| B | 3,100 |

D. Length of Public Streets in Incipient Inlets

| | State Highway | Town Streets |
|--------------------|---------------|--------------|
| Soundside | 1,000 (feet) | 6,400 (feet) |
| Old Nags Head Cove | 1,000 | 3,700 |
| Whalebone | 1,500 | 0 |

Note: Flood zones based on FHBM #4-01-07. 10/17/75.

Table 5-4. Continued

E. Beach Access Sites (All in V, A and B-zones and within 300 feet of ocean):

| In place: | Land | Improvements | Total |
|---------------------------|---------|--------------|---------|
| Nags Head Public Beach | 330,000 | 35,130 | 365,130 |
| Town Hall Beach Accessway | 20,000 | 6,000 | 26,000 |
| Gulfstream Street | ----- | 18,120 | 18,120 |
| Enterprise Street | ----- | 11,795 | 11,975 |
| Bittern Street | ----- | 12,955 | 12,955 |
| Bainbridge Street | ----- | 13,751 | 13,751 |
| Conch Street | ----- | 13,306 | 13,306 |
| Hargrove Street | ----- | 22,192 | 22,192 |
| Epstein Tract North | ----- | 18,470 | 18,470 |
| Epstein Tract Midway | ----- | 21,910 | 21,910 |
| Governor Street | ----- | 21,920 | 21,920 |
| Total | 350,000 | 195,649 | 545,649 |

F. Public Buildings

A-zone

Town Hall and adjacent buildings
 Gull Street Pumping Station
 South Nags Head Fire Station
 Jockey's Ridge Fire Station

C-zone

Eighth Street Water Plant

Note: Flood zones based on FHBM #4-01-07, 10/17/75.

Goal

It is the goal of Nags Head to reduce, to the extent possible, future damage from hurricanes and severe coastal storms. It is the Town's intent to reduce these hazards both in advance of such events and to require mitigation measures during reconstruction which reduce damages from future storms.

Policies

Pre-storm Mitigation

1. When new development is permitted in storm hazard areas, it should be at an adequate distance from those areas subject to the most severe storm forces. The Town will support and strictly enforce the setback requirements of the Coastal Area Management Act. (See Shoreline Management Policies.)
2. The Town of Nags Head will encourage the construction of public and private buildings which are more able to withstand the wind and water forces of hurricanes and other coastal storms.
3. The Town of Nags Head will, through subdivision and site review procedures, encourage development designed to reduce its vulnerability to hurricane and storm damage.
4. The Town of Nags Head will formulate a capital improvements program which will encourage growth away from the highest storm hazard areas and minimize the extent of public investment at-risk. This will include the siting of public facilities such as water distribution lines, in less hazardous locations in the community.
5. The Town recognizes that natural features of the barrier island, such as dunes and wetlands, act to mitigate the damaging effects of hurricanes. It is the Town's policy to protect and enhance these natural mitigation features.
6. The Town of Nags Head will, wherever possible, increase the amount of permanent open space available for recreation and other public purposes by taking opportunities to purchase land, or appropriate interests in land, in high hazard areas.
7. The Town of Nags Head will identify and track all non-local (federal, state, regional) policies, programs, and decisions which will influence the local mitigation of hurricane hazards, and attempt to affect these in ways which reduce the hazard locally.
8. The Town of Nags Head will, to the extent possible, seek to coordinate its pre-storm mitigation programs and policies with those of the County and the other beach communities.

9. It is the policy of the Town of support the National Flood Insurance Program (NFIP), and the construction and mitigation measures required under it. The Town believes, however, that the NFIP should more actively work to prevent storm and flooding damages from occurring in the first place, rather than simply reacting after the damages have occurred.

10. The Town opposes the construction of finger canals and will take all necessary actions to prohibit them.

11. It is Town policy to do everything possible to create more hurricane shelters.

Post-storm Reconstruction

1. The Town of Nags Head will, to the extent feasible, regulate the reconstruction of structures in high storm hazard areas which have been substantially damaged. Where reconstruction on such sites is allowed to take place, it will occur only at low densities.

2. During reconstruction Nags Head will regulate the construction of public facilities and public structures and the reconstruction of damaged facilities and structures in high hazard areas. Public facilities such as waterlines and roads will be extended or rebuilt in hazard areas only when absolutely essential, and only to such a size and degree necessary to serve the lowest possible level of density existing before the storm.

3. All reconstruction will be required to conform to the provisions of the North Carolina State Building Code. The Town of Nags Head will strictly enforce the code as well as continue to lobby the State for more storm-resistant provisions.

4. Damaged public facilities will be rebuilt consistent with the practices and objectives found in the Town's Capital Improvements Program.

5. If reconstructed, public facilities will, where possible, be flood proofed and upgraded to better withstand future hurricanes and storms.

6. Public structures will be rebuilt to such a strength that they may be used as shelters during subsequent storms. Public structures for which public access and visibility are not essential shall, where possible, be built or rebuilt on sites of high elevation.

7. During reconstruction, the Town of Nags Head will encourage, to the extent feasible, the construction of buildings that can serve as storm shelters.

8. Oceanfront reconstruction will not be permitted until such time as the CAMA setback line is reestablished.

9. During reconstruction, the Town of Nags Head will attempt to enhance the ability of residents to evacuate when another hurricane or severe coastal storm threatens.

10. The Town will take advantage of opportunities which may arise to purchase land or damaged properties in hazard areas following the storm.

11. When undertaking reconstruction decision making, the Town will seek to encourage redevelopment patterns which recognize and utilize the natural mitigative features of the coastal environment. Redevelopment should take into consideration any changes in natural conditions brought about by the storm (e.g., new inlets, changes in drainage patterns.).

12. The Town of Nags Head will create a special damage assessment team prior to the storm.

13. The Town will develop, prior to the storm, a plan and all necessary ordinances and procedures to effectively guide the reconstruction after a hurricane or severe storm.

14. The Town will establish, prior to the storm, a special storm reconstruction task force which will oversee the recovery and reconstruction process and serve as an advisory body to the Town Board of Commissioners on recovery/reconstruction issues. A main responsibility of this body will be to identify opportunities to mitigate future storm damages through the management of reconstruction.

15. The Town of Nags Head will make every effort to develop its capacity to identify and orchestrate various post-storm reconstruction resources, while at the same time ensuring maximum local control over the reconstruction process. It will be aggressive in its pursuits of funds for projects which will primarily affect Nags Head, and will coordinate its efforts with those of the County and other beach communities on projects that require joint funding or management.

16. The Town of Nags Head will integrate recovery and reconstruction planning with the broader set of planning goals and objectives for the community. The Town recognizes that a hurricane may provide a unique opportunity to modify existing development patterns and to accomplish Town objectives that would otherwise not be possible.

Chapter 6.

Traffic and Transportation

- A. Hurricane Evacuation
- B. Traffic Congestion

Problem Statement

As the permanent and seasonal populations of Nags Head expand, and the commercial areas which serve them, traffic on Nags Head streets will become an increasingly important concern. In addition to local traffic, as the Dare beach communities grow, Nags Head will receive substantial amounts of through-traffic. Two specific traffic problems can be identified: the capacity of the Town's road and bridge system to accommodate evacuation in the event of a hurricane or a severe coastal storm, and the ability of the Croatan Highway, and to a lesser extent Virginia Dare Trail, to move traffic efficiently and safely from the Kitty Hawk area to Whalebone Junction.

One of the most dramatic and serious implications of growth in Nags Head is the demand it places on the Town's capacity to evacuate in the event of a hurricane or storm. Using a methodology employed by Stone (1982), a background study contained in the Town's Carrying Capacity report, estimates the existing and future evacuation demand, and the ability of the existing bridge and road network to accommodate it. Four elements were considered in conducting the capacity evaluations: bridge capacity, evacuation demand, travel time, and evacuation capacity. All traffic generated south of the Nags Head/Kill Devil Hills line was assumed to evacuate to the south. Bridge capacity was estimated based upon the maximum normal flow of traffic over the bridge, corrected for such factors as slippery roads, fallen utility lines, and the use of lanes for emergency vehicles. It was estimated that the Highway 64 bridge to Roanoke Island could accommodate 768 vehicles per hour (See Table 6-1).

Evacuation demand is computed based upon the number and type of dwelling units in the Town. Assuming that 15% of the population leaves before an evacuation order is issued, and adding in traffic arriving from Hatteras Island, it is estimated that total evacuation demand at peak occupancy is 9,391 vehicles. Travel time is the amount of time it would ordinarily take to drive from the furthest point in Nags Head to the bridge. This calculation is a simple division of maximum distance by average speed (35 mph). Travel time for Nags Head is under one-half hour.

Evacuation capacity is estimated by calculating the amount of time required to move evacuating vehicles through the Highway 64 bridge and causeway. First, the period during which evacuation takes place is calculated. The National Weather Service indicates that it can provide no more than 12 hours of accurate warning before a hurricane landfall. In addition, roads are inundated or high winds prevent evacuation four hours before landfall. Subtracting this hazard cutoff time from the 12-hour warning time results in an eight hour evacuation period.

Table 6-1.

Nags Head Evacuation Analysis

BRIDGE CAPACITY

| | |
|--------------------------|---------------------------------|
| Normal flow | 1000 veh/lane/hr |
| Blockage factor | 0.85 (stalled cars, etc.) |
| Weather reduction factor | 0.65 (slick roads, etc.) |
| Lane/clearance factor | 0.77 (shoulder, sight distance) |
| Oversize vehicle factor | 0.95 (truck, trailer, RV) |
| Emergency vehicle factor | 0.90 (1 lane, 10% use) |

| | |
|--|-----|
| Total bridge capacity using two lanes (veh/hr) | 768 |
|--|-----|

EVACUATION DEMAND

| | |
|---------------------------|-----------|
| Permanent residential | 1690 DU's |
| Tourist residential | 2238 DU's |
| Vehicles per permanent DU | 1.60 |
| Vehicles per tourist DU | 1.10 |
| Early evacuees (%) | 0.15 |

| | |
|---|------|
| Nags Head vehicles | 4391 |
| Other vehicles (areas south of Nags Head) | 5000 |

| | |
|--|------|
| Evacuation demand at peak occupancy (total vehicles) | 9391 |
|--|------|

TRAVEL TIME

| | |
|------------------|-------------|
| Average speed | 35.00 mph |
| Maximum Distance | 15.00 miles |
| Travel time | 0.43 hours |

EVACUATION CAPACITY

| | |
|--------------------|-------------------|
| NWS warning time | 12.00 hours |
| Hazard cutoff time | <u>4.00 hours</u> |

| | |
|--------------------------|------------|
| <u>EVACUATION PERIOD</u> | 8.00 hours |
|--------------------------|------------|

Source: Nags Head Carrying Capacity Study, 1984.

Moving the total evacuation demand over the Highway 64 bridge and causeway will take over 12 hours; 9,391 divided by 768. If fifteen percent of the vehicles leave before the evacuation order is given, this will leave over 1,800 vehicles stranded on the island, after the 8-hour evacuation period. An additional 2.4 hours are needed to evacuate these remaining vehicles. The total time necessary for full evacuation is almost 15 hours, even if 15 percent of the population leaves prior to an evacuation warning. If no significant number of vehicles leaves prior to the warning, over 16 hours are necessary for full evacuation (See Table 6.2).

It should be noted that recent efforts are underway to simulate the effects of hurricanes on the North Carolina coast under a computer model known as SLOSH (Sea, Lake and Overland Surges from Hurricanes). These results will provide a great deal of information which will be useful both in formulating actual evacuation procedures, and in assessing evacuation capacity. For instance, SLOSH data will provide a more accurate estimate of the point (hours before landfall) at which wind and surge levels on the Highway 64 bridge will preclude further evacuation, under certain hurricane assumptions.

Table 6-2.

Nags Head Evacuation Analysis

| | |
|--|----------------------|
| Vehicles remaining until evacuation order is given | 7982 Vehicles |
| Vehicles which can be evacuated in 8 hours over the bridge | <u>6143 Vehicles</u> |
| Vehicles stranded on the island | 1839 Vehicles |
| Additional hours needed to evacuate these vehicles | 2.40 Hours |
| TOTAL EVACUATION TIME | |
| (Time necessary before landfall of the eye, assuming that 15% leave early) | |
| Hazard cut-off time | 4.00 Hours |
| Evacuation Period | 8.00 Hours |
| Travel time | 0.43 Hours |
| Additional hours needed | <u>2.40 Hours</u> |
| TOTAL | 14.82 Hours |
| Time necessary for complete evacuation (no vehicles leave before the order) | 16.66 Hours |

Source: Nags Head Carrying Capacity Study, 1984.

Compounding evacuation problems, and creating congestion and traffic demands generally, are development patterns along the Bypass. Although the Department of Transportation is currently widening Croatan Highway, its ability to accommodate traffic in an expeditious manner is threatened by the existence of strip commercial development, and numerous and frequent access points. These problems emerged in the results from the 1984 land use survey. A majority of respondents believed that access to the Bypass (57%) and commercial development along the Bypass (63%) should be limited. Respondents also believed that the number of streets allowed to enter onto the Bypass should be limited (77%).

Respondents to the 1984 survey were also asked whether they felt that one-way streets should be used to manage the flow of traffic in the Town. Some 38 percent expressed support for one-way streets, with an equal proportion opposed to such an action. Asked whether another two- or three-lane bridge from the island should be built, 37% supported this idea, while 35% opposed it. Approximately one-quarter were uncertain either way.

Respondents were also asked about the need for bikeways and sidewalks. Opinion is split on this issue, with 38% indicating a willingness to pay higher taxes to finance such improvements, and 49% opposing such improvements.

Goal

It is the goal of Nags Head to provide a street and bridge system which provides for the easy and safe movement for residents, and which permits quick evacuation of all residents and visitors of Nags Head in the event of a hurricane or severe coastal storm.

Policies

1. It is the policy of the Town to prevent congestion along Croatan Highway and to take whatever appropriate actions are necessary - including interim and permanent measures - to alleviate this traffic congestion.

2. The Town adopts the policy of encouraging development to locate in commercial parks rather than strips along Croatan Highway, and to encourage only the location of commercial uses along the Highway which do not generate substantial amounts of traffic.

3. It is the policy of the Town to evaluate all future development proposals for their potential impact on traffic congestion, and to manage this development so as to minimize its impacts on the local street system. More specifically, the Town encourages development to install exits onto side streets rather than Croatan Highway and discourages the number of entrances onto the Highway. The Town further encourages the use of shared parking areas and shared driveways among neighboring businesses.

4. The Town recognizes that as growth and development continue Croatan Highway will be required to accommodate even greater levels of traffic, and it strongly supports the five-laning of the entire length of the Highway.

5. The Town regards as the most restrictive constraint on development, the limited capacity to evacuate residents and visitors in anticipation of a hurricane. The existing development already exceeds the area's evacuation capacity and it is Town policy to significantly increase the capacity of hurricane shelters and to promote the construction of additional bridges to the mainland.

6. The Town believes that unless the capacity to evacuate additional people or to house additional people in hurricane shelters is expanded, all municipalities on the Outer Banks, together with the U. S. Park Service, should take measures to limit growth.

7. Nags Head recommends that Dare County revise its current Hurricane Evacuation Plan to more adequately address these issues. The plan should also be revised to incorporate the results of the SLOSH model when they become available.

8. The Town recognizes the difficulties and expense that would be involved in multi-laning Virginia Dare Trail and does not plan to support such an improvement in the future.

9. The Town recognizes the need to develop a detailed street and drainage improvement plan, as part of the Town's capital improvements program. Such a plan should identify and schedule road improvements which alleviate the congestion caused by increasing development and growth in the Town.

10. It is the Town's policy not to favor the use of vertical evacuation structures (housing people in the upper floors of tall buildings) for the protection of residents and visitors in the event of a hurricane or severe coastal storm.

11. The Town acknowledges that evacuation planning is a regional problem and it will work with other affected jurisdictions to improve evacuation.

Chapter 7.

Water Quality

- A. Septic Tank Density
- B. Storm Water Runoff

Problem Statement

As growth proceeds in Nags Head, the quality of existing ground water and surface water may be damaged significantly. The primary cause of such environmental damage is exposure of these water resources to sewage from septic tanks, the predominant method of wastewater disposal in Nags Head.

A septic tank is basically a detention tank in which some of the solids settle out of the wastewater and undergo anaerobic digestion in the tank. The wastewater moves by gravity out of the tank to a system of tiles or pipes in subsurface trenches, the drainfield, where treatment by bacteria in the soil is followed by absorption of the wastewater by the soil.

A properly functioning system relies upon the soil to absorb and adequately treat all wastewater generated from a site. All soils, however, are not suitable for septic tanks as they may not allow wastewater to drain through the soil or they may allow wastewater to pass to the ground water too quickly - hence without adequate treatment.

The advantages of disposal by septic systems are the use of natural aeration and filtration to treat wastewater close to the source of the wastewater, and their cost-effectiveness. The disadvantages and limitations of the use of septic systems are discussed later. Overdependence on septic systems for wastewater disposal on the Dare Beaches has been associated with degradation of water quality in Roanoke Sound, the closing of shellfish beds in the Sound, contamination of the surface aquifer on the Dare beaches and the possible contamination of the underlying water supply aquifer for the region.

Currently, 3,633 dwelling units, or 92% of the existing dwelling units in the Town of Nags Head, are using septic tanks. The potential contamination of water is a function of several factors, including soil suitability, depth to the water table, and proximity to surface waters. Soils on the Outer Banks are generally unsuitable for septic systems. Under Soil Conservation Service (SCS) criteria most soil in Nags Head is either classified as having severe or very severe limitations to septic tank use. State soil evaluations differ substantially from the SCS criteria, and generally indicate that soils are not as unsuitable for septic

tank usage. This discrepancy results from the fact that State regulations do not address soil permeability as a factor in soil suitability for septic tank use. State regulations allow on-site wastewater disposal in extremely porous soil where depth to water table is greater than 12 inches.

State regulations govern the installation, location and use of septic tanks. (15 NCAC 2H, Section .0300 et seq. and Section .0400 et seq. and 10 NCAC 10A, Section .900 et seq.) The regulations which govern the density of development permitted with the use of septic tank systems are as follows: lots platted prior to July 1, 1977, may use on-site systems on parcels as small as 5,000 square feet, which produces a density equivalent to approximately 8.7 units per acre; lots platted between July 1, 1977 and July 1, 1982, must be a minimum of 7,500 square feet, a density equivalent of 5.8 units per acre; lots platted after July 1, 1982, must be a minimum of 15,000 square feet, or a density equivalent of 2.9 units per acre. These new regulations require a repair and replacement area of equal size to the septic system utilized, and a 50 percent increase in the absorption area requirements if beds instead of trenches are used. The new regulations also make it more difficult for property owners to obtain an exception to the minimum horizontal distance requirements for previously patted lots.

Data concerning the maximum permissible densities of development served by septic systems indicate that the carrying capacity of the Town of Nags Head for septic tank treatment of wastewater without significant environmental deterioration and risk to public health may well have already been exceeded. A study done by the Department of Environmental Management, The Impact of Septic Tanks on Shellfish Waters, indicates that the maximum density for septic tank use without contamination of surface waters may be one septic tank for between every four to seven acres. Septic tank densities of one tank every four acres, in soils commonly found in coastal North Carolina, were found to lead to contamination of nearby surface waters. Based upon this, the maximum number of septic tanks that Nags Head can sustain in the entire Town is between 661 and 1,157 septic tanks.

In Nags Head there are approximately 3600 septic systems located on 850 acres of developed land. This yields an average density on developed acreage of 4.2 systems per acre.

Additional pollution from septic tanks can be reduced by requiring tertiary treatment through package plants, or through a public sewage treatment system. These alternatives would necessitate higher densities of development and are inconsistent with the desires of Nags Head to develop at relatively low densities. Results from the 1984 land use questionnaire indicate that respondents have conflicting feelings on this subject. On the one hand, a majority of the respondents expressed support for a

public sewer system, yet on the other hand, the vast majority of respondents indicated that current density requirements for residential duplex and multi-family structures were either about right or were too high. Many respondents may wish to see the benefits of a public sewer system but are unwilling to accept the higher development densities that could accompany it.

In addition to sewage, runoff from development will also damage the quality of estuarine waters. Stormwater runoff causes problems mainly because storm events produce large volumes of water in a short period of time. With an increase in impervious surfaces, this volume of runoff increases. When stormwater runoff occurs, sediments, topsoil, pesticides, nutrients, bacteria and toxic metals can enter the estuarine environment. This sudden slug of stormwater can alter the salinity and can adversely effect marine organisms.

Soundside runoff is exacerbated by development in close proximity to the shore, and which contains a large proportion of its area in impervious surfaces (e.g. parking lot pavement, roadways). In Chapter 2 (see Table 2-12) estimates of the extent of impervious surfaces under total future buildout indicate that such surfaces would more than triple from the existing level. A considerable portion of these projected impervious surfaces would have an impact on estuarine waters.

Goal

It is the goal of the Town to take all appropriate actions to protect the quality of estuarine and ground water resources. These actions of protecting water quality must be consistent with the Town's desire to keep future growth at relatively low densities.

Policies

1. The Town considers vital the protection of the ground water and estuarine waters and supports the adoption of ordinances and land use planning that protects these waters.

2. The Town favors tertiary treatment of sewage for moderate and high density development occurring in the Town.

3. The Town recognizes that fresh water and storm water pollutes the estuarine waters and opposes the unrestrained runoff of fresh water into the Sound.

4. The Town supports CAMA lot coverage requirements for the soundshore, and encourages future development to locate as far away from estuarine areas as is practicable. The Town will consider adopting soundside setbacks and lot coverage requirements more stringent than those required by CAMA.

5. The Town encourages large lots to be created next to the Sound, and actions which reduce the density of development in proximity to sensitive estuarine areas.

6. The Town will discourage private development with large amounts of impervious surfaces and high runoff potential. It will take actions to encourage or regulate the extent of impervious surfaces.

7. The Town will permit or encourage the location of higher density uses which can utilize package treatment plants on soils which are least suitable for conventional septic tanks.

8. The Town will encourage larger lot sizes in areas which are less suitable for conventional septic tank use, and in which reliance on conventional septic tank use is likely.

9. The Town favors innovative on-site alternatives to conventional septic systems, such as mound systems, low-pressure pipe systems, evapotranspiration beds, duplex drainfields, aerobic systems, land application, holding tanks, and no-flush toilets, in areas where soils are less suitable for conventional systems. These alternative systems may improve treatment of effluent in areas where septic tanks are permitted but where soil conditions or proximity to surface waters suggest that treatment by a conventional septic tank will be inadequate.

10. The Town favors a strict as possible interpretation of State regulations regarding sewage collection, treatment and disposal.

Chapter 8.

Sewer and Water Service

- A. Expansion of the Town's Water System
- B. Provision of a Public Sewer System

Water Supply and Distribution

Problem Statement

The central issue with respect to water supply is what level of development will require capital improvements in the water supply, transmission line, and distribution system. Each component in the water supply system represents a fixed and limited capacity which must be increased when demand exceeds its capacity. Increased capacity in this case is a matter of increased capital expenditure.

Capacity of Aquifer and Treatment System

The most important supply threshold is the capacity of the Roanoke Island aquifer. A recent report by Moore, Gardner and Associates for the County of Dare concluded that "it is evident that sufficient water supplies are available from the Roanoke Island Aquifer System to supply 15 mgd to the regional water system." (p. 5-14). The report concludes that once the capacity of the Roanoke Island aquifer is exceeded, the most feasible source of supply is development of the aquifer on the mainland. Development of this water supply source would be costly, requiring the construction of a transmission main across Croatan Sound. The 15 mgd capacity of the Roanoke Island aquifer thus seems to be the most important water supply threshold. This threshold applies to water demand for the entire county population served by the regional water system which includes Nags Head, Kill Devil Hills, Kitty Hawk, Manteo and portions of the unincorporated county.

Approximately one-third of the capacity of the Roanoke Island aquifer is being used. Because private wells in Wanchese are beginning to run dry, there are no plans to increase the pumpage of the aquifer. Consequently, the Fresh Pond has been reactivated and will provide 900,000 gallons per day. Test wells on the beach strand are also planned as the initial step toward investigating the feasibility of a desalination plant.

The Moore, Gardner study also projects water demand for the Regional Water Authority Service Area. They project the water demand for Nags Head in 2005 to be 6.1 mgd, and the water demand for the regional system to be 15.49 mgd. In 1983, Nags Head accounted for a demand of 1.5 mgd out of a total demand of 4.5 mgd for the entire system. This constitutes 33 percent of the total

demand. In 2005, Nags Head, according to Moore, Gardner, is projected to account for a demand of 6.1 mgd or approximately 40 percent of the total system demand. These projections are based upon continuation of the population and water demand trends that occurred between 1980 and 1984. Average annual growth between 1980 and 1984 was approximately 15 percent.

Presently, with the addition of the Fresh Pond, the Regional Water System can supply 5.9 mgd to the area. Nags Head's allotment of water from the system is 2.3 mgd. Currently, it is estimated that 1.9 mgd has been committed to existing development, leaving an uncommitted quantity of 400,000 gpd. This estimate is based upon analysis by the Planning and Development Department in February 1985.

The water demand analysis attempted to estimate the peak daily demand on the Nags Head water system for the summer of 1985. Analysis of actual billing data produced the following peak daily estimates: dwelling units, 400 gpd; motel unit, 213 gpd; restaurant seat, 35 gpd; retail space, 15 gpd per 100 square feet of gross retail space; office space, 7.5 gpd per 100 square feet of gross office space.

The peak single day pumpage by the Nags Head water plant was 1.59 million gallons on the July 4th week-end of 1983. The water demand from development constructed since July 4, 1983, was added to the 1.59 million gallon figure to estimate the peak demand for the summer of 1985. A peak day demand was estimated to be 1.9 million gallons.

Table 8-1 projects the peak day demand on the Nags Head water system to be 6.27 million gallons at buildout. This projection is based on the scenario of residential buildout. If the Town was allowed to reach full buildout with the existing composition of land uses, peak water consumption is projected to be 6.48 mgd (See Table 2-10). Buildout under this scenario would produce more motel and restaurant development than under the residential scenario. These uses are bigger water consumers than residential dwellings.

If the Moore, Gardner study is correct in its projection that Nags Head, by the year 2005 will constitute 40% of the regional water system's demand then the demand on the regional system at full buildout will be 16.2 million gallons per day. Nags Head will reach full buildout in 23 years if the rate of development since 1980 is allowed to continue.

Table 8-1.

Projection of Water Consumption at Residential Buildout

| | |
|---|------------|
| Total potential buildout on platted lots (DU's) | 6,520 DU's |
| Total potential buildout on unimproved parcels | 6,576 DU's |
| Additional motel rooms | <u>900</u> |
| Total potential dwelling units at full buildout | 13,096 |
| Additional motel rooms | 900 |

Assume 400 gal/DU/day

Estimate 840,000 gpd for existing commercial use (See Table 2-11)

Assume 213 gal/unit/day in motels

| | |
|--------------------------------|------------------------|
| Expected residential water use | 5,238,400 gal/day |
| Expected motel water use | 191,700 gal/day |
| Estimated commercial water use | <u>840,000 gal/day</u> |

| | |
|----------------------------------|----------------------------------|
| Total water use at full buildout | 6,268,000 gal/day or 6.27 mgd |
|----------------------------------|----------------------------------|

Source: Nags Head Carrying Capacity Study, 1984, and
Nags Head Planning and Development Department.

Water Distribution System

There are three factors affecting the capacity of the Town of Nags Head to transport and distribute water to its residents following delivery to the town by the Regional Water System. Three portions of the water delivery system affects the Town's ability to deliver water. They are: (1) pumping capacity, (2) storage tank capacity, and (3) capacity of the local water mains used for distribution.

The current capacity of the pumps which provide water for Nags Head is 2,500 gallons per minute. During peak periods in the summer months, Nags Head consumes 1,500 gallons per minute of this capacity. This results in 1,000 gallons per minute excess capacity for use by future development. At current average use per dwelling unit, an additional 2,600 dwelling units can be added to the system before additional pumping capacity is necessary (See Table 8-2). The units approved for the Epstein tract alone will consume this excess capacity.

An additional concern with pumping capacity is the speed with which storage tanks serving the Town can be refilled. As the Town's consumption approaches its pumping capacity, less excess capacity is available to refill these tanks and the rate of refill therefore is slower.

Table 8-2

Nags Head Water Distribution System

| | |
|--|-------------------------|
| Pumping capacity of Regional System (supply available to Nags Head) | 2500 |
| Nags Head peak use | <u>1500 gal/min</u> |
| Excess capacity for future use | 1000 gal/min |
| Dwelling units | 3928 DU's |
| Peak use | <u>1500 gal/min</u> |
| Average use | 0.382 gal/DU/min |
| Total capacity available | 2500 gal/min |
| Average use per dwelling unit | <u>0.382 gal/DU/min</u> |
| Total dwelling units served at capacity (capacity divided by average use) | 6545 DU's |
| -Note that this is pumping capacity only. | |
| Total additional dwelling units possible without adding pumping capacity | 2617 DU's |

(The amount of water used by other uses is shown in Appendix B,
Nags Head Carrying Capacity Study, 1984)

Storage Tank Capacity

| | |
|--|-------------|
| Capacity of tanks | 800,000 gal |
| Consumption per hour | 90,000 gal |
| Hours available on tank service alone | 8.9 hours |
| Hours required to fill tanks from empty (while still serving at peak use) | 13.3 hours |

Source: Nags Head Carrying Capacity Study, 1984.

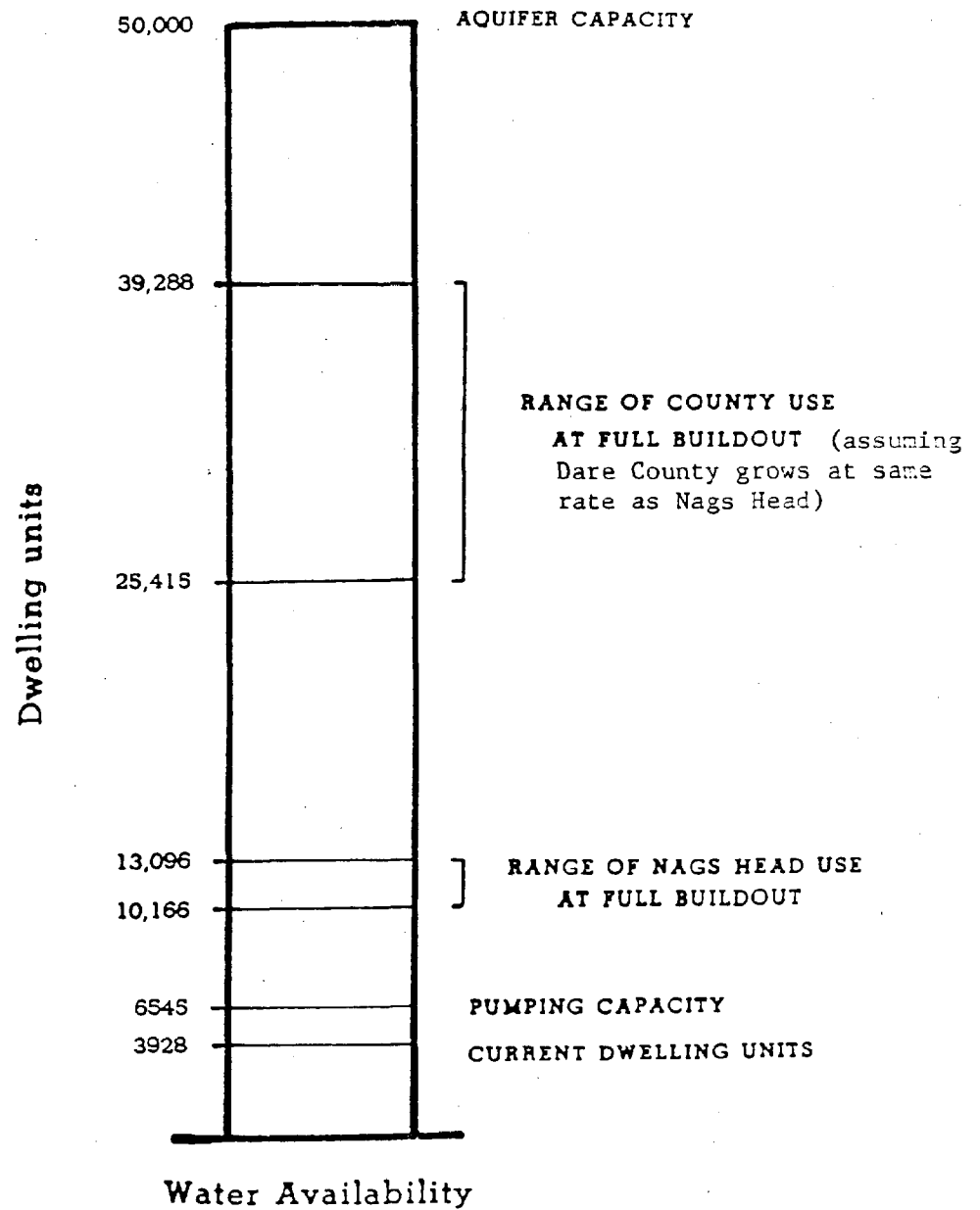
Storage tank capacity in Nags Head is currently 800,000 gallons. This 800,000 gallon storage capacity could serve Nags Head water consumption from storage alone for approximately nine hours at peak consumption. It should be noted, however, that peak consumption occurs infrequently for relatively short periods of time. If the tanks were empty, over 13 hours would be required to refill them while serving regular demand, using the excess 1,000 gallons per minute of pumping capacity currently available. As more water users are added to the system, this excess capacity diminishes, and the refill period becomes longer.

The capacity of the water distribution mains which serve individual neighborhoods in Nags Head is a critical threshold to the growth in these neighborhoods. When the size of a water main is inadequate for the volume of water demanded by its users, pressure loss results. This leads to user dissatisfaction and potential safety concerns. Relating the size of such mains in newly developed areas to the potential total demand on the main is crucial to the future capacity of the main to provide water to all potential users.

Currently, 12-inch trunk lines carry water to the Town along Virginia Dare Trail and Croatan Highway. These 12-inch lines feed a distribution network of 10-inch, 8-inch and 6-inch water lines, with much of the Town served by the 6-inch lines. The number of dwelling units which can be connected to the 6-inch line is limited. As more units tap onto this system, velocity of the water in the mains must increase to provide the same level of service. This in turn increases the head loss, or loss of pressure due to friction in the pipes.

The Nags Head system currently operates at 58 to 62 p.s.i. The losses of pressure due to friction over distance can be severe. These basic problems are aggravated in south Nags Head because the primary service (8-inch main) is a dead end line, which makes it difficult to keep flow and pressure high enough. An engineering study to address allowable friction loss and determine adequacy of mains throughout the Town would help pinpoint current problem areas. If pressure falls low enough, the ability to fight fires using hydrants along the water line becomes inadequate, leading to safety concerns.

Figure 8-1.
Water Availability



(Gallons/day converted to dwelling units)

Goal

It is the general goal of Nags Head to provide for sufficient levels of potable water to accommodate future growth, through the most economical and efficient means. It is the goal of the Town to pace the growth of water demand with the Town's capacity to provide adequate and economical water service.

Policies

1. It is Town policy that major improvements should be made to the water distribution system to allow it to deliver the water available from the regional system and to accommodate expected growth.
2. The Town favors investigation of innovative water conservation techniques and technology for use in new development and existing structures.
3. Private, on-site wells are encouraged for use in landscaping and other non-drinking sources.
4. The Town maintains the policy that the rate of growth shall be congruous with the capacity of our water supply and with the plans and financing ability to increase the water supply.
5. It is Town policy to cooperate with other local governments to conserve water and seek additional water supply.

Sewage Disposal

Problem Statement

As population and development continue to grow in Nags Head, the need for increased sewage disposal capacity will increase as well. Currently, the predominant means of sewage treatment in Nags Head is the use of septic tanks. Several package treatment plants have been built to accommodate the needs of high density development in the Town. The environmental implications of heavy reliance on septic tanks are identified in a chapter 7 on water quality and will not be repeated here. Despite these problems it is likely that the Town will continue to rely on this means of treatment, along with package plants for higher density uses. Based on several EPA studies (see references), the Town presently does not view the installation of a public sewage system as either economically sound or consistent with desired levels of density.

Goal

It is the goal of Nags Head to provide for the most economical means of sewage treatment and disposal, commensurate with the pace of growth and consistent with desired levels of density in the Town.

Policies

1. The Town believes the provision of a municipal sewer system is not affordable in Nags Head. The Town further opposes public sewer to avoid the pressures for high density development that is expected to follow the installation of sewer. It is believed that the high density made possible by public sewer would only exacerbate the problems of limited capacity in other areas (i.e., hurricane evacuation, water supply).

2. The Town is also opposed at this time to the concept of a regional sewer system, and believes that such a system would be too costly, and would generate more negative consequences than it would mitigate.

3. The Town encourages the use of package treatment plants where possible to minimize the negative impacts of septic tanks on the natural environment (see Water Quality, Chapter 7).

Chapter 9.

Economic Development

- A. Amount of Commercial Development
- B. Type of Commercial Development
- C. Impacts on Abutting Properties

Problem Statement

As a seasonal resort community Nags Head's questions of economic development differ from those more traditional concerns of attracting new industry and reducing unemployment found in other localities. For Nags Head, the question is how to best manage the commercial services needed to accommodate its increasing resort population, both seasonal and permanent. In recent years the Town has witnessed a surge in the number of commercial establishments locating in the Town. Table 2-7 depicts the local retail developments, and their square footage, which have occurred within the last five years. Commercial growth, however, is not without its costs. It creates traffic congestion, aesthetic and visual clutter, crime, and may create serious conflicts with surrounding residential uses (e.g. traffic and noise at late hours). The impacts on neighboring property is very much a concern in Nags Head because of the mixture of land uses, as shown on the Existing Land Use Map in Chapter 2.

Consequently, Nags Head must confront directly the question of commercial growth. Should it be allowed to continue? If so, at what pace? What types of commercial expansion, if any, is desirable? Should commercial uses be permitted to locate in new areas of Town? Some insights on this question can be provided from the results of the 1984 land use survey. When asked about the amount of land currently being consumed for commercial and residential uses only 3% of the respondents indicated that they would like to see more commercial uses and less residential use. In contrast, some 54% of the respondents indicated that they would like to see more residential land use and less commercial use.

Imbedded in the tradition of Nags head is the combination of commercial and residential uses. Many of the early merchants lived above or behind their commercial establishments. Several old commercial properties continue this feature of the community's character. A newly developed area called Gallery Row is attempting to revive the idea of combined uses. Several artists have constructed galleries and studios in combination with their residences. The Town set aside the area by designating a new zoning district and adopting regulations that encourage a village-type setting of residential and commercial properties. The residential/commercial development is an integral part of Nags Head's history and represents a part of the Town's character.

Goal

It is the goal of Nags Head to permit and encourage the location of commercial and other uses which provide residents with essential services and assist the Town in maintaining its self-sufficiency. The Town wishes to maintain its residential character and does not wish to expand its economic base in other areas.

Policies

1. The Town will not increase the amount of land available for commercial uses and the Town will consider working towards reducing the amount of land presently zoned for commercial uses.

2. Nags Head does not wish to become a regional commercial center and will control accordingly the type, amount and location of commercial uses. For instance, commercial activities generally oriented to residents and visitors of Nags Head are desirable but the Town does not wish to develop as a commercial district designed to serve a regional market.

3. Nags Head will be cognizant of the negative effects of commercial development and will take appropriate actions to minimize these effects, particularly where commercial uses locate near residential uses.

4. It is the policy of the Town that most industrial uses will not be permitted to locate within the Town, as these are believed to be incompatible with the residential character of the Town. This policy will apply to such activities as fish packing plants, energy facilities, timber cutting and the commercial mining of sand. However, warehousing and some light manufacturing are considered essential if the Town is to be self sufficient and should be permitted in appropriate locations.

5. The village setting created by the combination of residences and commercial establishments is a part of Nags Head's character. Future development is encouraged to preserve this feature of the Town.

Chapter 10.

Housing

- A. Mixture of Housing Types
- B. Impacts on Abutting Properties
- C. Quality of Structures

Problem Statement

Nags Head faces a number of fundamental questions concerning the mix, density and quality of housing. Increasingly, Nags Head is experiencing demand for multi-family uses. As Nags Head continues to grow this demand for more intensive types of development will likely increase. The Town must confront directly the question of what the appropriate mix of housing types should be. Other chapters of this plan address the density/mix question in terms of specific community goals, e.g. hurricane hazard reduction, water quality, visual and aesthetic impacts, etc. In addition to these specific reasons supporting particular mixes, does the Town have a general obligation to permit or encourage a diverse mixture of housing types and densities? If local economic forces support the building of multi-family units, to what extent should the Town permit these market forces to play themselves out? At what point do such market forces jeopardize Nags Head's traditional position as a low-density residential community?

Results from the 1984 land use survey indicate that residents and property owners in Nags Head very adamantly support the continuation of the Town as a low-density residential community. Approximately 94% of the respondents indicated that the preservation of the "family beach" image of the Town was important to them. When asked about the density of residential development, 65% of the respondents indicated that they would like to see lower densities for multi-family structures. Clearly public sentiment does not support higher density growth.

In addition are questions concerning the compatibility of different housing types. As a greater number of higher density, multi-family housing units are constructed, their uses may conflict in various ways with more traditional residential uses in the Town. Traffic, noise, litter, drainage, security and other problems may be created which did not exist before. Conversely, traditional single family uses may present multi-family residents with certain nuisances or obstacles, for instance by impeding beach access. If a mix of housing types is desired, future problems of compatibility must be addressed.

Nags Head must also address the question of housing quality. While new construction is governed by the State Building Code, numerous older structures in the Town are in a deteriorated or dilapidated condition. Currently, close to half of the existing houses in the Town are older than 10 years. Should the Town take actions to ensure the upkeep, appearance and structural integrity of these older buildings?

Goal

It is the goal of the Town of Nags Head to continue to grow primarily as a low-density residential community, while also accommodating a limited mix of other housing types. It is the goal of Nags Head to encourage the construction and maintenance of high-quality housing.

Policies

1. It is the Town's policy to encourage a mixture of land uses that consist predominantly of single family and duplex structures.
2. The Town encourages the clustering of compatible housing types, and where noncompatible types are to be located in close proximity that structural and design measures be employed to mitigate undesirable impacts on neighboring properties.
3. The Town will consider the adoption and enforcement of a minimum housing code to ensure the safety and good appearance of housing in the Town.
4. It is Town policy to support amendments to the State Building Code that will allow the code to better address concerns unique to the coastal region.

Chapter 11.

Visual and Aesthetic Resources

- A. Visual Clutter
- B. Open Space
- C. Historic District

Problem Statement

Traditionally, the Town of Nags Head has been considered a family beach, a vacation spot where families can come and enjoy themselves without worrying about traffic, congestion and noise. People have come to Nags Head for years in order to get away from such problems of city life. A primary reason people are attracted to Nags Head is the aesthetic and visual quality of the environment, including its beaches and green space, and the relative low density of its development. Many of these amenities and visual qualities, however, are changing and will continue to change, at even more dramatic levels, as population and growth pressures increase. Already, high-density, multi-family structures have emerged as a major use competing with low-density residential. As more development occurs, and as filling of vacant areas progresses, the visual spaciousness of the Town will decline. The increase in commercial development, and the signs, lights and other features which accompany such uses, will also lead to deterioration of the aesthetic qualities of the Town.

The results from the 1984 land use survey illustrate the importance of these qualities. Respondents first and foremost want to preserve the idea of Nags Head as a family beach. They want to maintain open spaces along the ocean, the sound and in forested and vegetated areas and they are willing to pay higher taxes to ensure it. They are in agreement that they would rather see less commercial use of the land in Nags Head, and would like to see more land area required around residential buildings. A majority want no more large motels constructed on the oceanfront.

The design and architecture of structures built in the Town will also influence the aesthetics of the Town and should be viewed as a visual resources to be guarded. As construction and development in the Town continue there is no assurance that architectural styles and the built environment in general will be pleasing to the eye. A particularly important question is whether future development and growth will jeopardize existing historic and architecturally significant structures in the Town. More specifically, a sizeable group of historic beach cottages exists in the Town, built shortly after access from the mainland became available. This area extends approximately 9/10 of mile, lying north of the Town Hall, and includes some 60 houses. These houses

were added to the National Register in 1977, as Nags Head Beach Cottage Row District. Most of the homes are still in the ownership of the original family.. The houses are of an easily identifiable architectural style with wood siding, two stories on the main frame and quarters extending like an "L" to the beach road.

Historic and architecturally significant buildings can be adversely affected, both directly and indirectly, by a large number of activities. All construction projects have the potential to require the demolition of important, though simple, structures on a site as well as to alter the use of nearby land thereby causing secondary impacts to a building of historic or architectural importance. In addition, new construction is frequently unnecessary as existing buildings can be renovated for adaptive reuses; often these are uses quite different from the use intended at the time of a building's construction. Rehabilitation is more energy conservative and job intensive than new construction, and recycles elements of the coastal historic character into every day use.

Nags Head must decide whether it should take affirmative actions to ensure the preservation of these homes. Considerable, though far from unanimous, support for the establishment of an historic district in this area was expressed in the 1984 land use survey. When asked whether they would like to see the creation of such a district, approximately 50% of the respondents indicated they would. About 32% indicated that they would not like such a district. A fairly large number of respondents, 27%, were uncertain about the issue one way or the other.

Goal

It is the goal of Nags Head to preserve to the greatest extent possible the aesthetic and visual integrity of the Town, and its natural and man-made environment. The Town recognizes that it is these qualities in large part which account for the attractiveness of Nags Head as a place to live and vacation.

Policies

1. The Town believes that the existence of open space contributes to the feeling of spaciousness and the integrity of the visual environment, and it is the Town's policy to investigate ways of acquiring and maintaining perpetual open space.
2. The Town will increase the amount of open space in the Town by increasing the setbacks and open space required of new developments in exchange for allowing greater building heights.
3. The Town will encourage, through its development review procedures, buildings and landscape designs which protect the existing visual integrity of the community.

4. It is the policy of Nags Head to continue improving the appearance of the Town through sign, lighting and noise controls.

5. The Town favors the creation of an historic district to contain the historic beachfront cottages, but no action will be taken to establish such a district until a clear majority of the affected property owners support it.

Chapter 12.

Recreation and Open Space

- A. Open Space
- B. Shoreline Access and Use
- C. Conventional Recreational Amenities
- D. Jockey's Ridge State Park

Problem Statement

The availability of recreational resources is a primary reason that Nags Head is an attractive place in which to live and vacation. As population and development increase in the future, recreational opportunities will need to keep pace. Clearly a key recreational resource is open space. Open space is also important for visual and aesthetic reasons and this is discussed in the previous chapter (11). Here we are concerned with open space which can be used for more active recreational purposes. As noted in other chapters, the results of the 1984 land use survey indicate the extremely high importance of open space, particularly along the Town's shoreline. The preservation of open space along the ocean beaches was considered important or very important by 96% of the survey's respondents. Some 88% of the respondents indicated that preservation of open space along the soundside shore and dunes was either important or very important.

Obviously in a barrier island community such as Nags Head recreation and open space are intimately tied to beach and shoreline access and use. Even though considerable amounts of wet-beach areas may exist for public use, such areas will not satisfy future recreational needs if additional space and sufficient public access points are not provided. As future growth and development occurs the capacity and adequacy of the public beach and existing access points will likely be exceeded. The 1984 survey results support the importance of access points. When presented a list of possible recreational facilities, more respondents selected beach access areas as important enough to be built at public expense than any other recreational improvement, selected by 60% of the respondents. A close second place is parking for beach access, selected as important by 57% of the respondents. Sound access areas was selected as important by 34% of the respondents.

As the Town expands, its need for other more traditional recreational facilities will expand as well. From the land use questionnaire, the following recreational improvements were selected as important by at least 10% of the respondents: tennis courts (15%), boat ramps and moorings (27%), golf courses (10%), playgrounds (19%), picnic areas (28%), and jogging and walking paths (40%).

Jockey's Ridge State Park is a great recreational amenity in Nags Head. It provides a vast amount of open space and rigorous terrain for hikers. The soundside of the park presents an excellent opportunity for a public beach. Because the park entrance is not well identified many people park their cars in private parking lots across Croatan Highway. The Town should encourage better establishment of the park, especially in terms of identifying the formal entrance and parking area.

Goal

It is the goal of Nags Head to provide sufficient types, and adequate levels, of recreational opportunities for residents and visitors.

Policies

1. It is Town policy to provide adequate recreational opportunities, particularly space for beach use and parking near the ocean and sound beaches.

2. The Town recognizes the potential demand for access to the public trust waters and will continue to provide or assist in the provision of such accesses at every opportunity.

3. The Town supports efforts to enhance and facilitate pedestrian travel to existing and future beach and sound access points. This may include, for instance, the installation of sidewalks in key areas. The Town favors a Town park once the demand is well documented.

4. The Town recognizes that the need for such traditional community recreational facilities as tennis courts and jogging trails will increase with growth and will plan for these improvements accordingly.

5. It is Town policy to provide passive recreational use of the Town owned property of Nags Head Woods.

6. The Town will encourage or require the provision of recreational amenities in future development projects.

7. The Town favors better identification of the formal entrance to Jockey's Ridge State Park.

Chapter 13.

Nags Head Woods

- A. Features of Natural Area
- B. Future Development

Problem Statement

The Nags Head Woods is an irreplaceable, maritime forest occupying the northwest portion of Nags Head. The Woods includes the Fresh Water Pond (water supply), a large stable marshland, large vegetated (and a couple unvegetated) sand dunes, a forest with ponds and wetlands. The Woods was the home of the first settlers. Its ecological significance has been amply documented in terms of endangered and threatened species. The Woods is one of a few remaining maritime forests in North Carolina and consists of ecologically important marshland, pine hammocks, bay forest, the ridge, hardwood and pine forests, ponds and dunes. Each part of the system is important to the whole, although the least adverse environmental impacts would result from development in the bay and hardwood forests away from the ponds. The Woods is also environmentally significant because of its natural role in the integrity of the coastal region.

The existing land use in the Woods is limited to a handful of residences and one farm. The remainder is in its natural state. In the future, the Town can expect to feel increasing pressure for development. Much of the Kill Devil Hills part of the Woods is already platted for development. The current management system relied on to protect environmentally sensitive features, the water supply and man from natural hazards is as follows. The marshes are protected by the Coastal Resources Commission through an AEC permit and by the Corps of Engineers. Regulations are designed to prevent fill which would be necessary for residential or commercial development. Similarly AEC and zoning regulations restrict development in the bay forest to building above flood elevation, etc. Development near the Fresh Water Pond which forms the public water source is also limited by AEC regulations and the zoning ordinance which restrict septic systems to one per acre within 1,200 feet of the edge of the Pond and eliminate their use within 500 feet of the same.

In the 1984 land use survey, 85% of the respondents said that preservation of open spaces, forests and vegetation was important or very important.

Nags Head Woods represents a significant, limited and irreplaceable area where management is needed to protect the natural, cultural, recreational and scenic features. The presence of the Woods in Nags Head makes the region a desirable place in which to live, work and visit.

Goal

It is the goal of the Town to protect the natural integrity of Nags Head Woods as a unique and important natural area.

Policies

1. It is Town policy to protect the wooded, vegetated nature of Nags Head Woods. The Town adopts a policy of minimizing as much as possible land disturbing activity in the Woods.

2. The unique features of the Woods call for an environmentally sensitive set of land use regulations that may differ from standard regulations used elsewhere in the Town.

3. It is Town policy that there shall be no commercial cutting of timber within the Town. (See Economic Development chapter.)

4. It is Town policy that privately owned portions of Nags Head Woods be developed at the lowest possible residential density.

5. The Town intends for the municipally owned property to be principally used for passive recreational uses. Any other uses of the Town-owned land, such as for Town buildings, will include the highest practical levels of environmental sensitivity.

Chapter 14.

Police and Fire Protection

A. Impact of Rapid Growth

Problem Statement

As the Town of Nags Head grows so will its need for police and fire protection. Heightened development patterns brings about new and different needs as well. Not only must the Town fire department deal with an increased number of structures, these structures are increasingly larger and denser. The size and configuration of new commercial and residential structures in the Town will require additional fire fighting equipment. For instance, as structures in the Town become taller, the Town will need to acquire elevated spray capacity. Presently the Town's fire fighting capacity consists of two paid employees and the remainder volunteers. Two fire stations are currently manned. The Town must adequately address how it plans to satisfy the future fire protection needs created by growth.

The need for police protection in the Town can also be expected to increase with growth. Presently the police department is a small one, usually with no more than two or three patrolmen on duty at any one time. According to the police department, commercial areas tend to generate higher levels of crime and needed police services. Consequently, the expansion of commercial uses indicates that the Town can expect an increased need for police services in these areas. The emergence of multi-family uses creates new and different security problems from those which exist in a community which is exclusively single family detached residential. With special police needs aside, the simple increase in the number of residents and visitors in the Town, and the increasing amount of development over which these services are spread, will require the Town to expand the level of police personnel and resources in the future.

An important issue is the effect that actual development or design has on fire and police safety. The materials used in construction, the design and layout of structures (e.g. for fire truck access), and the fire protection components internal to development (e.g. sprinkler systems) all impact the level of protection in the Town, and the need for expanded fire service. Similar observations apply to police protection. Residential and commercial developments can be planned and designed to achieve various levels of security and personal protection. For instance, the provision of adequate lighting, the orienting of structures to provide defensible and containable spaces. As with fire

protection. projects can also be designed to facilitate conventional police protection, such as enhancing the ability of the police to move from one neighborhood to the next, and requiring landscaping which does not obstruct the view of police patrolmen.

Goal

It is the goal of Nags Head to provide adequate levels of police and fire protection for existing and future residents and visitors, and to provide these services in the most economical and timely manner.

Policies

1. It is the policy of the Town to continually assess the police and fire protection needs of the Town and to make personal and resource expenditures commensurate with the needs created by future growth and development.
2. The Town will encourage or require that new residential and commercial developments be designed so as to enhance fire and police protection.
3. The Town encourages the construction of motels, multi-family and commercial projects of non-combustible materials.
4. The Town further encourages the use of sprinkler systems and stand-pipes, the provision of fire lanes and emergency vehicles accesses to be some of the most important traits of quality development.
5. The Town favors amendments to the State Uniform Building Code for the purposes of better addressing coastal concerns in the construction business.

Chapter 15.

Solid Waste

A. Impact of Rapid Growth

Problem Statement

The Town presently cooperates with the County in the collection and disposal of solid waste. The Town employs its own collection system which deposits garbage at a central county transfer point on Roanoke Island. From there the County picks up the garbage and disposes of it in a county-run landfill on the mainland. Given this interdependence with the County it is difficult to precisely gauge what future disposal capacity needs and issues may be. Future growth in the Town will clearly produce larger levels of solid waste. In Chapter 3 on managing future growth it calculated that under total future buildout (See table 11), solid waste generation would more than triple from a current estimated 2,171 cubic yards per pick-up to 7,130 cubic yards per pick-up.

This future growth in solid waste will create a need for expanded collection personnel and equipment, and perhaps the development of additional disposal sites and/or disposal methods. The Town must assume complete responsibility for addressing collection needs and work jointly on the disposal objective with the County.

Goal

It is the goal of Nags Head to provide for the adequate and economical collection and disposal of solid waste.

Policies

1. It is the policy of the Town to closely monitor the generation of solid waste and to make necessary expenditures to increase its collection capacity commensurate with future levels of growth and development.
2. While presently somewhat beyond its control, it is the Town's policy to closely monitor the existing landfill capacity of the County, and to take whatever actions are necessary to encourage an expansion of disposal capacity when needed.
3. If it appears that County disposal capacity will not satisfy future Nags Head needs, it is the Town's policy to explore other possible approaches to disposal (e.g. incineration).

4. The Town in its development review processes will encourage project designs which facilitate the collection of solid waste (e.g. clustering waste containers), and which minimize any negative effects that might result from the collection system (e.g. visual buffers for waste containers, location of container sites to minimize impact of local traffic during collection, etc.)

Chapter 16.

Public Participation and Intergovernmental Coordination

- A. Need for Public Participation and Coordination
- B. Difficulties Encountered

Problem Statement

Crucial to any democratic process of land use planning is the continual and ongoing participation and impact of the public. Future growth has implications for this area as well, as it may be increasingly difficult to accommodate this type of involvement. As the community grows, more intimate channels of communication are often made difficult. At the same time growth and change in the community further increases the need for such public involvement in several ways. First, the number and magnitude of the land use and community problems in a high growth situation makes citizen input and involvement all the more important. Thus the problems confronted are more difficult and more in need of the direction citizen participation can provide. Second, citizen involvement is more important in a dynamic community because there is less certainty about what the fundamental desires and attitudes of residents are. Citizen involvement is less important in a static community because public officials can predict the opinions and attitudes of the populace with relative certainty.

An effective citizen participation program in Nags Head is hampered by several factors. Because Nags Head is a highly seasonal community, a practical difficulty exists in assessing the attitudes and desires of non-resident property owners. This group exceeds in number permanent year-round residents. Moreover, even if the difficulties of contacting these individuals are overcome, useful participation on an ongoing basis is quite difficult. Many of these individuals are apathetic concerning planning issues that may not appear to have implications for them in the short-term. The challenge to the Town of Nags Head is to maintain an ongoing citizens' participation program which acknowledges and overcomes, to the extent possible, these unique limitations. The Town's Citizens Advisory Committee represents a wide cross-section of citizens and have overcome many of these difficulties.

Currently, the Town encourages public participation and awareness in government activities through questionnaires, newsletters and public meetings. The public is notified well in advance of the times and agenda of the Planning Board and Board of Commissioners meeting and the public is encouraged to attend.

An additional issue included within this chapter is that of intergovernmental cooperation. It is clear that in each of the preceding issue areas, Nags Head is not a unilateral actor. Its decisions are constrained by the decisions of other municipalities and other levels of government. For many of the goals it wishes to advance, the Town will have to cooperate with other governmental bodies, and in effect become participants in their administrative and legislative processes. For instance, to achieve adequate preparation for hurricane evacuation it will have to cooperate with, and attempt to influence, Dare County. Nags Head must recognize that its growth and future destiny is closely tied to the interests and decisions of other governmental units.

Goal

The Town of Nags Head is committed to continual and ongoing citizen participation and intergovernmental coordination in its land use planning and decision-making. The Town recognizes the special importance of citizen involvement in managing the Town's future growth and development.

Policies

1. The Town will continue to provide a strong citizen participation program for the future.
2. The Town has a policy of cooperating with other municipalities on the Dare Outer Banks, with the County, State and federal government in pursuing all the aforementioned policies.

Chapter 17.

Policies and Implementation Methods

In the previous chapters land use policies, plans and regulations were discussed. This chapter summarizes those policies and indicates the range of effects that may occur as a result of their implementation. Also presented in this chapter are the proposed implementation methods for each policy.

The following are twenty-three policies which represent the majority of the policies in the previous chapters. Along with each policy are the implementation methods necessary for achieving that policy. CAMA requires that all adopted policies and implementation methods be achievable by local governments and are within the fiscal constraints and management system of local governments.

1. Increase setbacks and lower density along the sound shoreline.

Implementing actions:

- A. Amend zoning ordinance to require development to locate at greater distances from shoreline.
- B. Require clustering of development away from sound shoreline in Nags Head Village and Nags Head Woods.
- C. Employ TDR/density bonuses for transference of development densities to sites further inland.

2. Reduce density and the extent of development along ocean shoreline; encourage future high density growth west of Virginia Dare Trail.

Implementing actions:

- A. Amend zoning ordinance to reduce the permissible density of the Commercial Residential Zoning District.
- B. Employ TDR and density transfer from beachfront areas to areas west of Virginia Dare Trail.
- C. Review oceanfront development regulations for their impact on the location of oceanfront structures. Adopt the necessary amendments to shift the location of structures as far west as possible.

3. Protect the integrity of ocean beach and dune system and acknowledge the natural processes and dynamics of the shoreline. It is the Town policy that seawalls, jetties and groins or other artificial devices designed to stabilize the ocean shoreline shall not be permitted, but the Town shall allow the temporary use of sand bags to protect the shoreline.

Implementing actions:

- A. Require dune crosswalks for all new oceanfront development.
- B. Require proposed development to rebuild and revegetate dunes for the purpose of creating and maintaining a continuous dune line along the oceanfront.

4. Prepare in advance to regulate reconstruction following a hurricane; reduce densities in high hazard areas and preserve natural mitigative features of environment during rebuilding.

Implementing actions:

- A. Prepare and adopt a detailed reconstruction plan that identifies criteria for applying special procedures and regulations to guide rebuilding after a severe storm.
- B. Organize and train a damage assessment team and reconstruction task force to advise the Town's decision-makers.
- C. Create and adopt all necessary ordinances for application following a hurricane that will enact moratoria, issue building permits and site plan approvals for selected purposes, require baseline data when needed (i.e., mapping of newly formed drainage patterns), apply new development standards, and other functions needed in a reconstruction plan. (See Hurricane Hazard Mitigation and Post-Storm Reconstruction Report.)
- D. Devise procedures, forms, permits, check lists and other tools considered necessary to implement the reconstruction plan.
- E. Develop baseline mapping and data gathering prior to a coastal storm. The information collected will consist of main location and cut-off valves, benchmark values, location of roads, etc. This information will be helpful in determining property lines, utility locations and elevations when implementing the reconstruction plan.

5. It is the Town policy to reduce the risks and vulnerability of structures to damage and loss from hurricanes and coastal storms in advance of such events.

Implementing actions:

- A. Require new development to locate adequate distances from storm hazard areas.
- B. The Town will encourage the construction of buildings which are more able to withstand the wind and water forces of coastal storms.
- C. The Town through subdivision and site plan review and encourage development to be designed to reduce its vulnerability to hurricanes and coastal storms.

6. Regulate reconstruction of public facilities following a hurricane.

Implementing action:

Prepare and adopt detailed plans establishing criteria and stipulating reconstruction decisions concerning public facilities.

7. Regulate public and private development in high hazard locations.

Implementing actions:

- A. Limit the extension of public services and facilities to such areas through detailed capital improvements program.
- B. Consider the adoption of overlay zoning ordinances to reduce permissible densities in these high hazard areas.
- C. Consider high hazard areas (e.g., in incipient inlet areas) in any program of public acquisition.

8. Increase availability and access of hurricane shelters for residents and visitors of Naqs Head.

Implementing actions:

- A. Construct additional shelters by Town with funds collected from impact fees and/or land transfer tax.

- B. Enact ordinances and fee schedules to require the provision of adequate shelters, or payments to a hurricane shelter fund in lieu thereof.
- C. Develop a plan that identifies future public shelter needs, locations and design standards.
- D. Construct future Town structures to withstand hurricanes and to serve as hurricane shelters.

9. Do not expand, and consider reducing the size of the Town's commercial zoning districts; minimize undesirable impacts of commercial development on Bypass traffic congestion.

Implementing actions:

- A. The Town will work towards modifying the zoning map to reduce the amount of land zoned for commercial use.
- B. Provide incentives for future commercial development on clustered sites, with shared parking and driveways, and with access onto roads other than the Bypass.
- C. Amend the zoning ordinance and map to create more specialized commercial districts.
- D. Require vegetative and other types of barriers along property lines abutting residential uses.

10. Make needed improvements to Croatan Highway, including its expansion to five lanes along its entire route.

Implementing action:

Lobby the State for five-laning Croatan Highway.

11. Construction of additional bridge(s) to the mainland.

Implementing action:

Lobby State for construction of additional bridge(s).

12. Reduce impervious surfaces and accompanying runoff, particularly in sound shoreline area.

Implementing actions:

- A. Amend the zoning ordinance to decrease the amount of permitted impervious surface.

- B. Amend the drainage ordinance to prohibit more storm water runoff after development than occurred prior to development.
- C. Amend the Town's drainage plan to direct runoff into detention/retention ponds or through ocean outfalls. This will likely require the installation of additional ocean outfalls or acquisition of land for ponds.

13. Discourage the use of septic tanks in areas where soil is highly unsuitable and encourage the use of tertiary treatment for moderate and high density development.

Implementing actions:

- A. Encourage the use of tertiary treatment plants where practical and require tertiary treatment for high density conditional uses.
- B. Employ TDR to transfer density away from low soil suitability areas.

14. Allow the pace of growth that is commensurate with the Town's ability to provide basic services (i.e., police, fire protection, solid waste and water service).

Implementing actions:

- A. Development of a detailed capital improvements program (CIP) indicating needed improvements, their expected sources of funding, and a schedule of these improvements for at least five years into the future.
- B. Consider the adoption of ordinances that pace the Town's growth with its ability to provide the necessary capital facilities.

15. It is the Town's policy to encourage a mixture of land uses that consist predominantly of single family and duplex structures. The Town feels that commercial activities should be oriented to providing services for residents and visitors.

Implementing actions:

- A. The Town should consider reducing or redistributing the amount of land available for commercial development.
- B. The Town will monitor the rate of growth, land use and density.

16. The Town will consider the adoption and enforcement of a minimum housing code to ensure the safety and good appearance of housing in the Town.

Implementing actions:

- A. Develop and adopt a minimum housing code.
- B. Assign staff to implement a minimum housing code.

17. Increase stringency of building standards to enhance resistance of local structures to hurricanes, fire and local conditions.

Implementing actions:

- A. Support and lobby for proposed State coastal building standards.
- B. Obtain legislation allowing the Town to prepare and enact local building code standards more stringent than those of the North Carolina State Building Code.
- C. Amend the zoning ordinance to require fire lanes around high density development.

18. Protection of the visual and aesthetic qualities of Naags Head, in particular, open space and the historic district.

Implementing actions:

- A. Organize a Community Appearance Commission to prepare and adopt appearance and design standards to be administered by the commission.
- B. Prepare and enact an historic district ordinance for the historic beach cottage area when the affected property owners support such an ordinance.
- C. Enact more stringent setback and open space requirements for new development.
- D. Modify zoning and site plan review standards to permit additional building height for projects which incorporate additional passive open space areas.
- E. Develop and adopt landscaping requirements.
- F. Lobby the State for land acquisition and recreation funds.

G. Fund Town open space acquisitions through impact fees.

19. Increase public access and the amount of recreational open space use of the ocean and estuarine shorelines and increase open space in other areas.

Implementing actions:

- A. Implement an impact fee schedule that will require payment of fees to be used for providing public access and public use of the shorelines.
- B. Continue submitting grant applications for shoreline access projects when the opportunities arise.
- C. Develop an Open Space Plan designed to identify key locations for land and easement acquisition.
- D. Acquire scenic and limited use easements for the purposes of maintaining open space.
- E. Organize and initiate a non-profit corporation created to receive donations and grants, and to acquire land and easement for the purpose of preserving open space.
- F. Institute open space exactions, or fees in lieu thereof, during the subdivision approval process.

20. The Town recognizes the need for and will plan for passive recreational areas as well as the need for a Town Park and other traditional community recreational facilities to meet the needs of the Town's residents.

Implementing actions:

- A. The Town will be receptive to providing limited access to Town owned property in Nags Head Woods. Any access developed would be designed to minimize environmental impacts and would be coordinated with current management policies and agreements.
- B. The Town will monitor any grants which would assist in the acquisition or development of recreational areas.
- C. The Town will develop a site plan for a municipal park.
- D. The Town will maintain its management agreement for Nags Head Woods with the Nature Conservancy that will provide for hiking trails and other passive uses of the Woods.

21. Protect Nags Head Woods as a critical and important natural feature of the Town.

Implementing actions:

- A. Modify the zoning ordinances to reduce permissible density in this area.
- B. Enact special performance standards and develop regulations which minimize the impacts of new development on this area (e.g. loss of vegetation, land disturbance during construction, etc.).
- C. Acquire undeveloped land in Nags Head Woods area by the Town when opportunities arise.
- D. Support the acquisition of land by State and other interested private organizations (e.g., conservation foundation).
- E. Maintain Town-owned land in undeveloped state; providing public with passive recreational uses.
- F. Employ TDR to provide for transfer of private development potential away from the most sensitive areas to other more suitable development sites.
- G. Encourage development outside of Nags Head Woods through development criteria in water tap ordinance.

22. The Town will continue to provide a strong citizen participation program for the future.

Implementing actions:

- A. The Town will continue to solicit public comments through public opinion surveys to ensure a strong public voice in the government of Nags Head.
- B. The Town will continue to utilize the Citizens' Advisory Committee as a vital link to the governing body of Nags Head.
- C. The Town will encourage public participation in all public meetings and public hearings.
- D. The Town will continue to disseminate information to the residents and visitors by the use of newsletters, newspapers and published reports to bring the public up to date on government activities.

23. The Town has a policy of cooperating with other municipalities on the Dare Outer Banks, with the County, State and federal government in pursuing all the aforementioned policies.

Implementing actions:

- A. The Town will actively participate in the Town and County Planning Forum.
- B. The Town will participate in meetings as requested.
- C. The Town will continue to work with other local governments to identify and resolve common issues.

The following table (17-1) indicates the effects that can be expected when a specific policy is implemented. In most cases the implementation of a policy will have an effect in several issue areas. For example, the implementation of Policy 2, which seeks to reduce density and the extent of development along the ocean shoreline would also effect such issue areas as shoreline management, hurricane mitigation, water quality, economic development, visual and open spaces, and recreation and beach access. Table 17-1 will assist the Town in analyzing the consistency between the land use plan and adopted land use ordinances, capital improvement plans and budgets and the local administrative ability to carry out the policies.

After the policy discussion process a proposed time schedule for these actions will be outlined which will be achievable by the Town and will be within the fiscal constraints and management system of the Town.

Table 17-1.

Table 17-1.

Interrelationships of Policies

| POLICY | SHORELINE MANAGEMENT AND PROTECTION | HURRICANE AND COASTAL STORM HAZARD | TRAFFIC AND TRANSPORTATION | WATER QUALITY | SEWER AND WATER SERVICE | ECONOMIC DEVELOPMENT | HOUSING | VISUAL AND AESTHETIC RESOURCES | RECREATION AND OPEN SPACE | NAGA HEAD WOODS | POLICE AND FIRE PROTECTION | SOLID WASTE DISPOSAL | PUBLIC PARTICIPATION |
|--|-------------------------------------|------------------------------------|----------------------------|---------------|-------------------------|----------------------|---------|--------------------------------|---------------------------|-----------------|----------------------------|----------------------|----------------------|
| 1. Increase setbacks and lower density along the sound shoreline. | ● | ● | | ● | | | ● | ● | ● | | | | |
| 2. Reduce density and the extent of development along ocean shoreline; encourage future high density growth west of Virginia Dare Trail. | ● | ● | | | | ● | ● | ● | | | | | |
| 3. Protect the integrity of ocean beach and dune system and acknowledge the natural processes and dynamics of the shoreline. It is the Town policy that seawalls, jetties and groins or other artificial devices designed to stabilize the ocean shoreline shall not be permitted, but the Town shall allow the temporary use of sand bags to protect the shoreline. | ● | ● | | | | | | ● | | | | | |
| 4. Prepare in advance to restrict reconstruction following a hurricane; reduce densities in high hazard areas and preserve natural mitigative features of environment during rebuilding. | | ● | | | | ● | ● | ● | | | | | |
| 5. It is the Town policy to reduce the risks and vulnerability of structures to damage and loss from hurricanes and coastal storms in advance of such events. | | ● | | | | | ● | | | | | | |
| 6. Regulate reconstruction of public facilities following a hurricane. | | ● | | | | | ● | | ● | | | | |
| 7. Regulate public and private development in high hazard locations. | | ● | | | | ● | ● | | ● | | | | |
| 8. Increase availability and access of hurricane shelters for residents and visitors of Naga Head. | | ● | | | | | | | | | ● | | |
| 9. Do not expend, and consider reducing the size of the Town's commercial zoning districts; minimize undesirable impacts of commercial development on Bypass traffic congestion. | | | ● | | ● | ● | | | | | ● | | |
| 10. Make needed improvements to Croatan Highway, including its expansion to five lanes along its entire route. | | ● | ● | | | | | | | | | | |
| 11. Construction of additional bridge(s) to the mainland. | | ● | ● | | | | | | | | | | |
| 12. Reduce impervious surfaces and accompanying runoff, particularly in sound shoreline area. | ● | | | ● | | | | ● | | | | | |
| 13. Discourage the use of septic tanks in areas where soil is highly unsuitable and encourage the use of tertiary treatment for moderate and high density development. | | | | ● | | ● | ● | | | | | | |
| 14. Regulate the pace of growth commensurate with the Town's ability to provide basic services (i.e., police, fire protection, solid waste and water service). | | | ● | | ● | ● | ● | | | | | | |
| 15. It is the Town's policy to encourage a mixture of land uses that consist predominantly of single family and duplex structures. The Town feels that commercial activities should be oriented to providing services for residents and visitors. | | | | | | ● | ● | ● | | | | | |
| 16. The Town will consider the adoption and enforcement of a minimum housing code to ensure the safety and good appearance of housing in the Town. | | | | | | | ● | ● | | | | | |
| 17. Increase stringency of building standards to enhance resistance of local structures to hurricanes, fire and local conditions. | | ● | | | | | ● | | | | ● | | |
| 18. Protection of the visual and aesthetic qualities of Naga Head, in particular, open space and the historic district. | ● | ● | | | | ● | | ● | ● | | | | |
| 19. Increase public access and the amount of recreational open space use of the ocean and estuarine shorelines and increase open space in other areas. | | | | | | ● | | ● | ● | | | | |
| 20. The Town recognizes the need for and will plan for passive recreational areas as well as the need for a Town Park and other traditional community recreational facilities to meet the needs of the Town's residents. | | | | | | | | | ● | ● | | | |
| 21. Protect Naga Head Woods as a critical and important natural feature of the Town. | | | | ● | ● | | | ● | ● | ● | | | |
| 22. The Town will continue to provide a strong citizen participation program for the future. | ● | ● | ● | ● | ● | | | | ● | | | ● | |
| 23. The Town has a policy of cooperating with other municipalities on the Dare Outer Banks, with the County, State and federal government in pursuing all the aforementioned policies. | | | ● | | ● | | | | | | | ● | ● |

Chapter 18.

Land Classification System

The land classification system, with an accompanying map, is developed to aid local governments in identifying the intensity of existing and future development. The classification system illustrates the relationship between policy statements and the various areas of Town. This system and map are merely a tool to help implement policies and not a strict regulatory mechanism to control or limit the issuance of building or CAMA permits.

Land Classification Classes

The land classification system can include five classes: Developed; Transitional; Community; Rural; and Conservation. Local governments may subdivide these classes into more specific subclasses. Three classes have been applied for this land use map: Developed; Transitional; and Conservation.

Developed Class. The purpose of the developed class is to provide for continued intensive development and redevelopment. Developed areas are urban in character and include mixed land uses such as residential, commercial, industrial, institutional and other uses at high to moderate densities. Town services including water, streets and roads, and police and fire protection are provided to some extent in the Developed land class. The developed class for this land use plan is subdivided into two categories. Subclasses refer to land currently high intensity relative to the remainder of the Town.

Subclass D-1.

Lands within this subclass are generally between Virginia Dare Trail and Croatan Highway and along the western periphery of Croatan Highway. Portions of this area are now intensively developed with mixed land uses at high to moderate densities. Intensive residential and commercial development is expected to continue. If this area were destroyed, by a hurricane for example, the Town would not oppose reconstruction at the present level of intensity. In other words, land in the D-1 subclass is outside of high hazard areas.

Subclass D-2.

Subclass D-2 encompasses much of the land east of Virginia Dare Trail. This area is currently developed at the same intensity as the land in D-1. When redevelopment occurs, either as the result of the age of the structures or natural disasters, it should be at a lower level of intensity than now exists. Redevelopment should address the policies developed in the

previous chapters and take into account greater oceanfront setbacks and lower density than now exists. Redevelopment should be directed toward maintaining open spaces along the ocean, fewer commercial uses and greater land area around residential buildings. As identified in the earlier chapter, large motels constructed on the oceanfront should be reconstructed outside of the hazard areas. Redevelopment should be directed toward enhancing Nags Head as family oriented beach community.

Transition Class. The purpose of the transition class is to identify land slated for future development. The lands must be suitable for development and can be provided with the necessary urban services. Transition areas are those which are currently under development or will be developed in the next five to ten years to accommodate anticipated population and urban growth. Transition areas will provide land for development when the developed lands are no longer available. Two subclasses of transition lands are proposed. Transition subclass T-1 identifies land on which relatively high intensity development will not be opposed by the Town. Subclass T-2 depicts land on which low intensity development is preferred.

Subclass T-1.

These areas will provide for future mixed land uses at moderate densities. Services including water, streets, police and fire protection can be made available if they do not already exist.

Subclass T-2.

These areas will provide for predominately residential growth at low densities. For subdivision of land, lot sizes will be 15,000 square feet or larger. T-2 areas will also serve as a buffer between the more intensively developed areas and the less developed conservation areas.

Conservation Class. The purpose of the conservation class as identified in the previous policy chapter is to provide for the effective long-term management and protection of significant, limited or irreplaceable resource areas. Conservation areas should be either not developed at all or developed in an extremely limited and cautious fashion. Two subclasses for conservation areas are proposed, C-1, which would allow limited residential development, and C-2, which would allow no development (State parks, unbuildable lands, marsh).

Subclass C-1.

These are areas which are environmentally significant lands because of their natural role in protecting the ecology and integrity of the coastal region. They include hardwoods, swamp forests, areas of wildlife habitat and contain significant productive, natural, scenic, cultural or recreational resources which make the region a desirable place in which to live, work and visit. Conservation subclass C-1 should either not be developed at all (preserved) or if developed, done so in an extremely limited and cautious fashion. Urban services should not be provided to stimulate intense development. Maximum density should be ONE of residential unit per acres. The adoption of a conservation overlay district would be one possible management tool for conservation areas.

Subclass C-2.

These areas include AEC's, public trust waters, estuarine waters and wetlands and the ocean beaches, and Jockey's Ridge State Park. Development on these lands are prohibited by State and federal regulations.

Land Classification Map

REFERENCES

- Brower, David J., William E. Collins, and Timothy Beatley, Hurricane Hazard Mitigation and Post-Storm Reconstruction Plan for Nags Head, North Carolina (Coastal Collaborative, Ltd, Chapel Hill, N. C.; 1984)
- Brower, David J., et al., Carrying Capacity Analysis, Nags Head, North Carolina (Coastal Resources Collaborative, Inc., Chapel Hill, N. C.; 1984)
- Brown, J. D., S. Wearden and S. Ghorpade, Town of Nags Head 1984 Land Use Survey (School of Journalism, University of North Carolina, Chapel Hill, N. C.; 1984)
- Lynch, L., Potential Inlet Zones on the North Carolina Coast (School of Forestry and Environmental Science, Duke University; 1983)
- McDowell-Jones, Storm Water Drainage Design Manual for the Town of Nags Head, North Carolina (McDowell-Jones, Elizabeth City, North Carolina; 1982)
- Moore, Gardner and Associates, Comprehensive Engineering Report on Water System Improvements for the County of Dare (1984)
- Nags Head-Kill Devil Hills, Thoroughfare Plan, (Planning and Research Department, North Carolina State Highway Commission; 1972)
- Nags Head, Town of, Land Use Plan (Coastal Consultants, Ltd., Chapel Hill, N. C.; 1980)
- Nags Head, Town of, Nags Head Traffic Operations and Parking Study, (Division of Highways, North Carolina Department of Transportation; 1983)
- Nags Head, Town of, Zoning Ordinance (amended through July 1985)
- Nags Head, Town of, Water Consumption Unit Allocation Ordinance (August 1985)
- Neumann, C., et al., Tropical Cyclones of the North Atlantic Ocean, 1871 - 1980 (NOAA; June 1978, revised July 1981)
- North Carolina, Coastal Area Management Act of 1974
- North Carolina Department of Environmental Management, The Impact of Septic Tanks to Shellfish Waters (1982)

Stone, J. R., Hurricane Evacuation Planning: Estimating Evacuation Times for Non-Metropolitan Coastal Communities (UNC Sea Grant, Raleigh, N. C.; 1982)

Titus, J., "Planning for Sea Level Rise Before and After a Coastal Disaster" in Barth, M. and J. Titus, ed. Greenhouse Effect and Sea Level Rise: A Challenge for This Generation (Van Nostrand, Reinhold, New York, N. Y.; 1984)

U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Rate Map, Town of Nags Head, Dare County, North Carolina (October, 1975)

U. S. Environmental Protection Agency, North Carolina Barrier Islands Generic Environmental Impact Statement Environmental Inventory (1981)

U. S. Environmental Protection Agency, North Carolina Barrier Islands Environmental Impact Statement, Wastewater Management (EPA 904/9-84-117; 1984)

MEETINGS AND WORKSHOPS

June 10, 1985: Nags Head Citizens' Advisory Committee, Preliminary discussion on Land Use Plan

August 28, 1985: Joint Board of Commissioners/Planning Board workshop, Discussion of first draft of Land Use Plan

September 25, 1985: Joint Board of Commissioners/Planning Board workshop, Discussion of second draft of Land Use Plan and policies

October 14, 1985: Citizens' Advisory Committee, Discussion of second draft of Land Use Plan

December 9, 1985: Citizens' Advisory Committee, Discussion of Land Use Plan

January 14, 1986: Joint Board of Commissioners/Planning Board workshop, Discussion of policies, implementation methods and priorities

February 18, 1986: Planning Board recommendations

March 3, 1986: Public hearing

